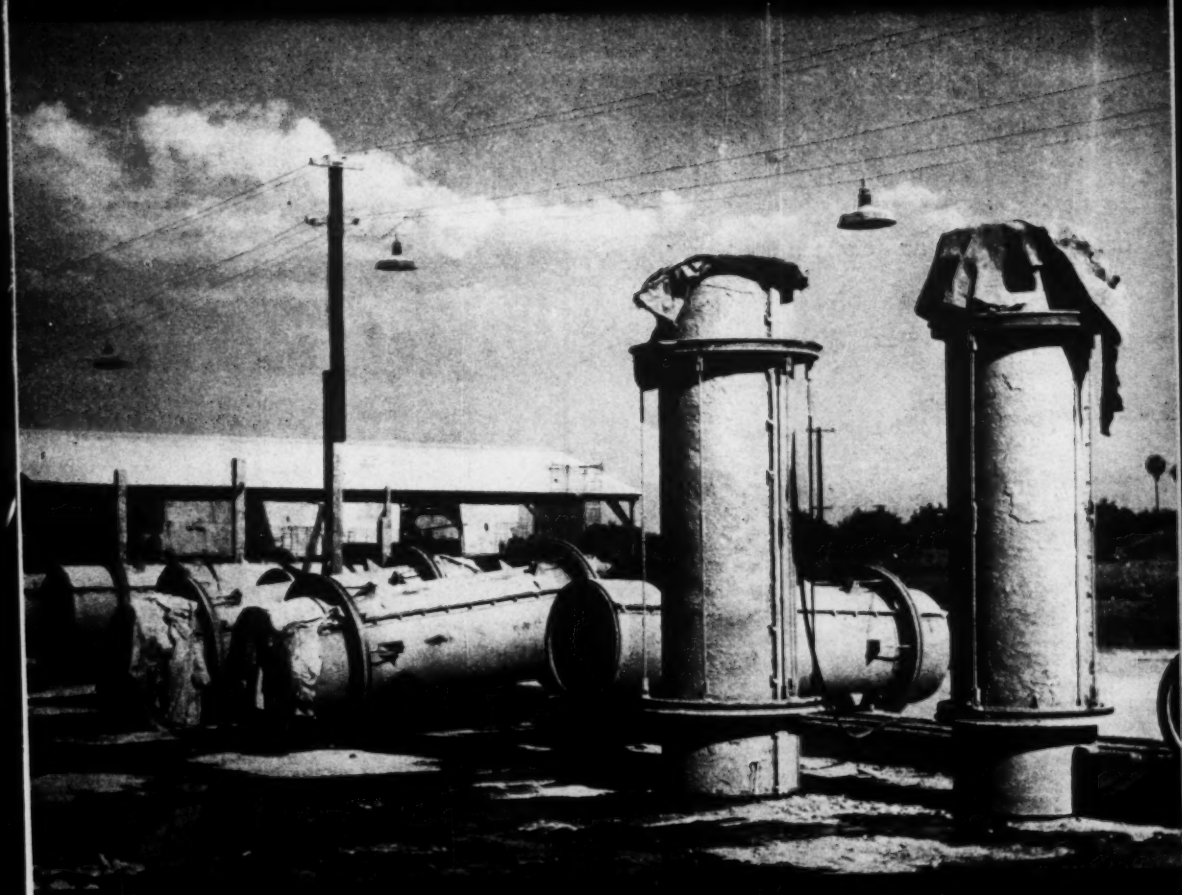
ENGINEERING NEWS-RECORD



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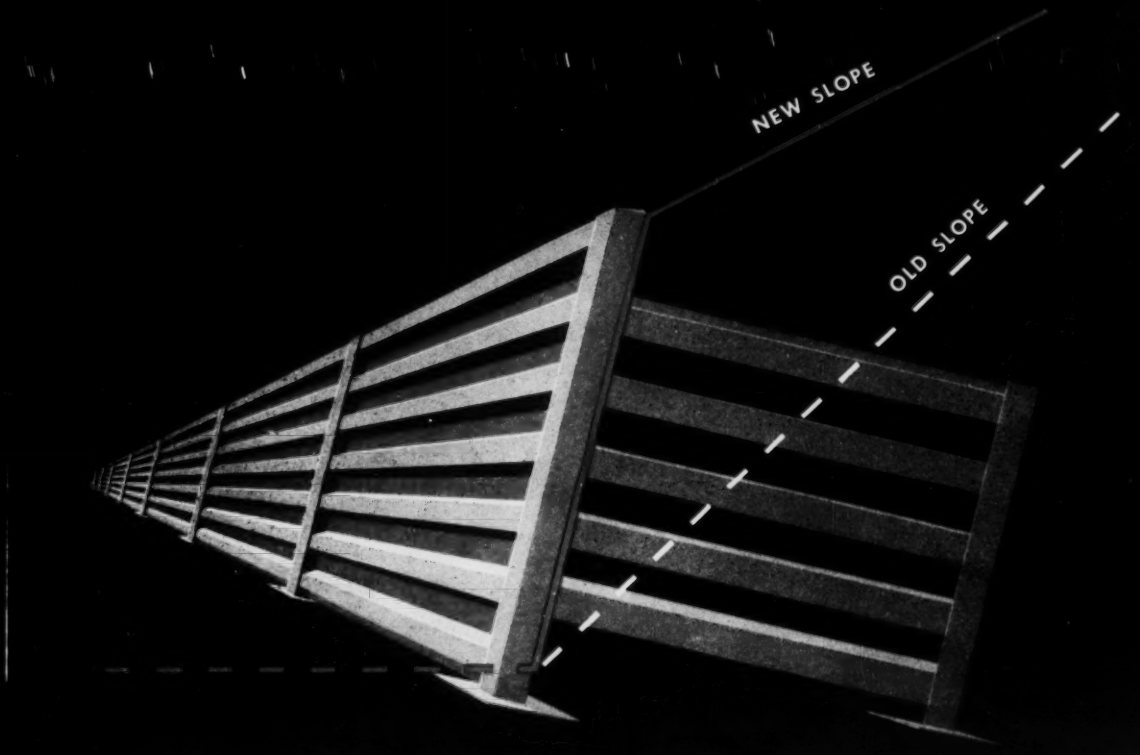

A new slant on the "angle of repose"

When unstable slopes seek their "angle of repose" they often cause a lot of trouble. Engineers used to solve such problems with heavy massive retaining walls. Then Armco engineers had a new slant. They said: "Why not make earth itself do most of the work?" The result—Armco Bin-Type Retaining Wall.

The advantages of this flexible metal wall are obvious. Less material need be transported to the job site. Handling is easier and less excavation is required. Individual units are nestable for shipment and storage.

Unskilled men do the work quickly using only hand tools. Armco Walls are adaptable to curves and changes in elevation; can be extended or completely salvaged. Thousands of installations prove them ideal for unstable slopes, limited right-of-ways, stream erosion and similar uses.

Making products simpler and more efficient has been a prime goal at Armco for more than 40 years. So has the designing of products to meet specific needs. Today you can bring your drainage and construction problems to Armco with full assurance that you will receive all the benefits of long experience, extensive research and a real interest in helping you solve these problems.

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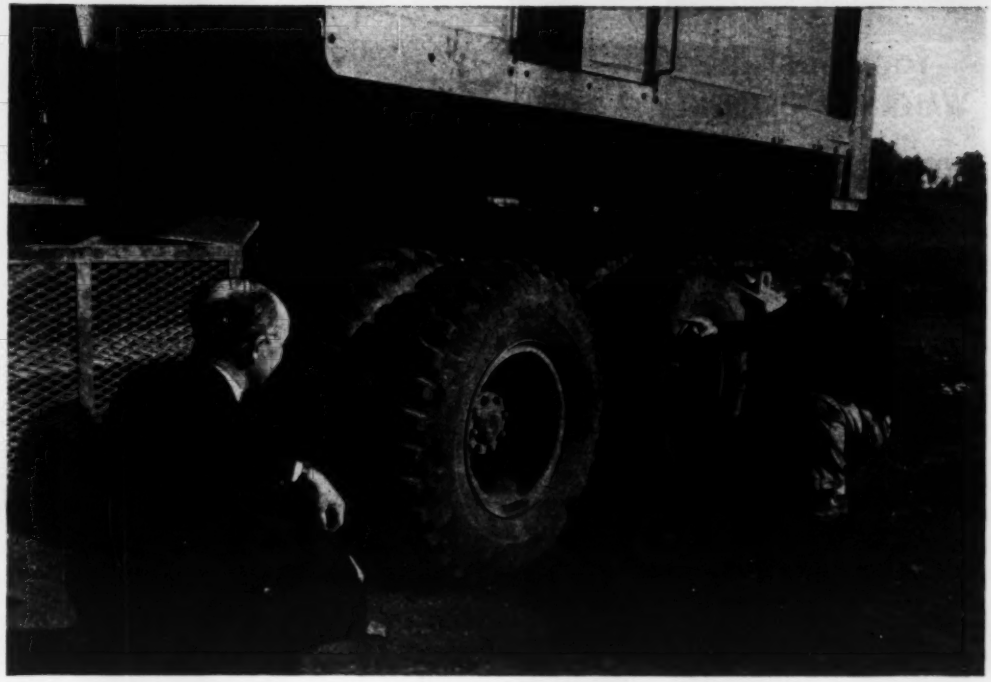

Tire cut-resistance proved on steel slag road bed

THE 30-ton mobile crane pictured above is one of 20 vehicles used by a salvage operator in the heart of the Gary, Indiana steel mill area. The tires that carry these vehicles roll over the toughest kind of road beds . . . razor-sharp slag, a bed of jagged edges. A bulldozer slices the top off a slag pile—and that's the road. Here dump trucks, bulldozers and truck-mounted cranes are in service in all kinds of weather.

These trucks, however, are 100% B. F. Goodrich equipped and there has not been one single road delay caused by tire trouble since these BFG's have been in service.

B. F. Goodrich tires were selected for use because of their superior cut and bruise resistance. The operator has found that the special tread compounds used in B. F. Goodrich tires and the unique tread design of B. F. Goodrich Universals keep cutting to an absolute minimum. These tires have greater bruise resistance because they are made with the patented B. F. Goodrich *nylon shock shield*. Strong, elastic layers of nylon are built in between the tread rubber and the cord body. Under strong impact, these nylon cords stretch and work together to absorb and distribute the shock evenly. This special feature is found in *all* BFG tires of 8 or more plies at no additional cost.

No matter what kind of off-the-road service you demand, there's a special B. F. Goodrich tire to fill your needs. Let your local dealer help you get better service and lower operating overhead. *The B. F. Goodrich Company, Akron, Ohio.*

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Volume 147 OCTOBER 11, 1951 No. 15

WALDO G. BOWMAN
Editor

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Number of copies of this issue printed, 50,339

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Domestic News Bureaus—Atlanta, Chicago, Cleveland, Detroit, Houston, Los Angeles, San Francisco, Washington. Correspondents in 71 cities in the United States, Canada and Mexico.
Foreign News Bureaus—London, Frankfurt, Paris, Moscow, Tokyo, Bombay, Melbourne, Rio de Janeiro, Mexico City. *Correspondents*—Athens, Rome, Caracas, Buenos Aires, Santiago, Shanghai, Zurich, Johannesburg and 40 other cities.

ROBERT F. BOGER
Publisher

October 11, 1951 ENGINEERING NEWS-RECORD Vol. 147—No. 15
Member ABC and ABP

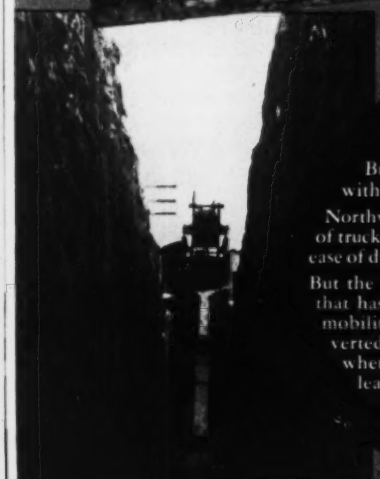
Published weekly by McGraw-Hill Publishing Company, Inc., James H. McGraw (1860-1948) Founder. **Publication Office, 99-129 North Broadway, Albany 1, N. Y.**

Executive, Editorial and Advertising Offices: McGraw-Hill Building, 330 W. 42nd St., New York 18, N. Y. Curtis W. McGraw, President; Willard Chevalier, Executive Vice-President; Joseph A. Gerardi, Vice-President and Treasurer; John J. Cooke, Secretary; Paul Montgomery, Senior Vice-President, Publications Division; Ralph B. Smith, Editorial Director; Nelson Bond, Vice-President and Director of Advertising; J. E. Blackburn, Jr., Vice-President and Director of Circulation.

Subscriptions: Address correspondence to Engineering News-Record—Subscription Service, 99-129 N. Broadway, Albany 1, N. Y., or 330 W. 42nd St., New York 18, N. Y. Allow ten days for change of address.

Please indicate position and company connection on all subscription orders.

Single copies 35¢. Subscription rates—United States and possessions, $6.00 a year; $9.00 for two years; $12.00 for three years. Canada, $8.00 a year; $12.00 for two years; $16.00 for three years. Pan American countries, $15.00 a year; $25.00 for two years; $30.00 for three years. All other countries $20.00 a year; $30.00 for two years; $40.00 for three years. Entered as second class matter October 29, 1936, at the Post Office at Albany, N. Y., under Act of Mar. 3, 1879. Printed in U. S. A. Copyright 1951 by McGraw-Hill Publishing Co., Inc.—All Rights Reserved.



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But, that was before they saw it work! For the first time a trench could be dug without going into the cost of a one-purpose machine.

Northwest Pullshovels brought depths to over 20 feet, straight-wall trenches, new ease of truck loading, ability to work in the confined conditions of streets and alleys, and a new ease of digging basements without the delays and costs of putting the machine in the hole.

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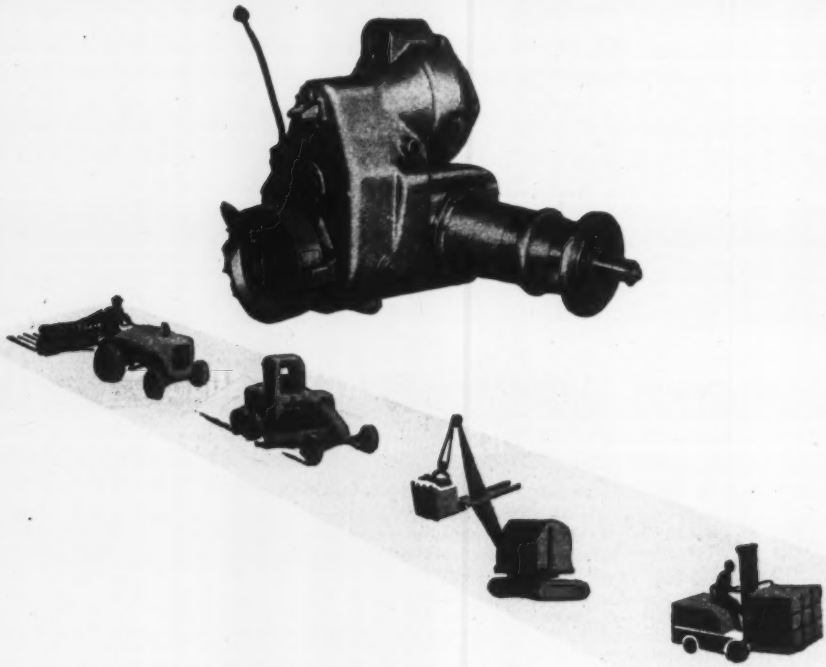

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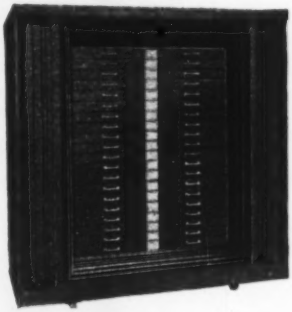

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A "fire-proof" building is no protection. The building will not burn – but its contents will.

Ordinary steel units offer no protection. Steel transmits heat – and paper chars at temperatures as low as 300° F.

The Remington Rand Safe-Cabinet Map-and-Plan Unit shown at left represents the safest, surest protection made. It is certified by the Underwriters' Laboratories to protect paper contents against heat of 2000° F. for at least 4 hours. *Certified* against impact too – even though it should drop 30 feet while white-hot.

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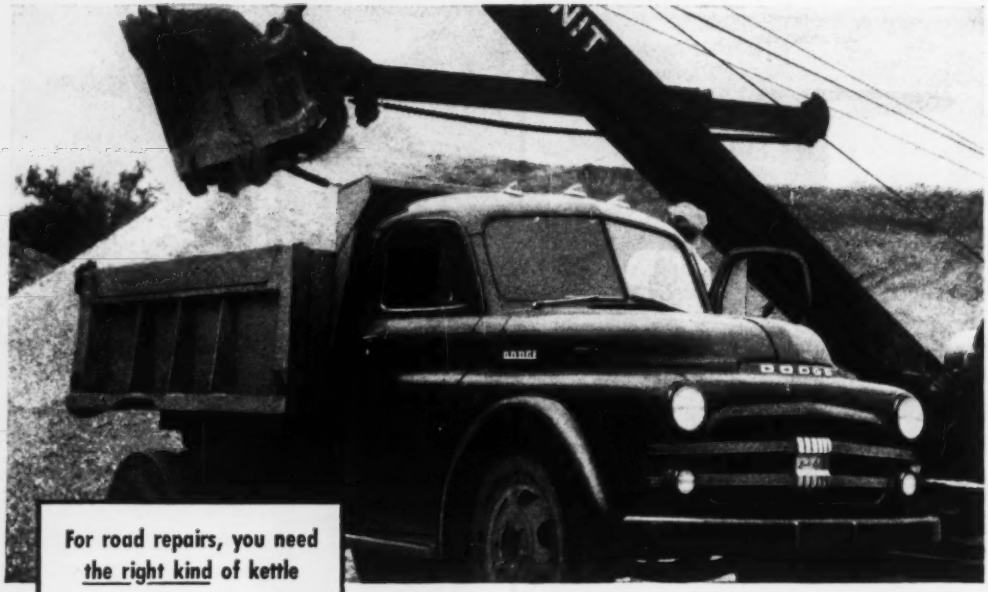
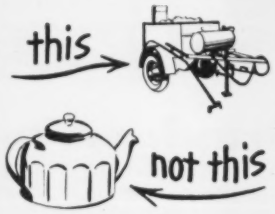


For road repairs, you need the right kind of kettle



Same way with trucks. Get one that fits the job!

Thrifty power for rugged jobs... with dependable DODGE "Job-Rated" TRUCKS

Give a Dodge "*Job-Rated*" truck the rough treatment your job demands . . . and watch it perform with *low-cost dependability* year after year!

Plenty of thrifty power! For example, 2½-ton models have a rugged, powerful engine that's rated at 114 h.p. And, to assure even greater power with top economy, high-tonnage models (2¾-ton and up) are offered with twin carburetion and exhaust system.

But that's not all! Back a Dodge into a tight spot—see how easily and sharply it turns, how easily the steering wheel turns! New worm-and-roller steering gears on many models are just one of many reasons why Dodge "*Job-Rated*" trucks are easier to handle.

Then consider advantages like the new moistureproof ignition system and new high-torque capacity starting motor—and you'll know why new Dodge "*Job-Rated*" trucks are more dependable, even in the worst weather.

You'll save in many ways with a truck that fits your construction operation—a Dodge "*Job-Rated*" truck. Talk it over with your friendly Dodge dealer *soon!*

How Dodge trucks are "*Job-Rated*" for the construction business

A Dodge "*Job-Rated*" truck is engineered *at the factory* to fit a specific job . . . save you money . . . last longer.

Every unit from engine to rear axle is "*Job-Rated*"—factory-engineered to haul a specific load over the roads you travel and at the speeds you require.

Every unit that SUPPORTS the load—frame, axles, springs, wheels, tires, and others—is engineered right to provide the strength and capacity needed.

Every unit that MOVES the load—engine, clutch, transmission, propeller shaft, rear axle, and others—is engineered right to meet a particular operating condition.

"Job-Rated" TRUCKS DO THE MOST FOR YOU

Raymond MAKES 5 TYPES OF CONCRETE PILES

1. STANDARD . . . 2. STEP-TAPER . . . 3. PIPE STEP-TAPER

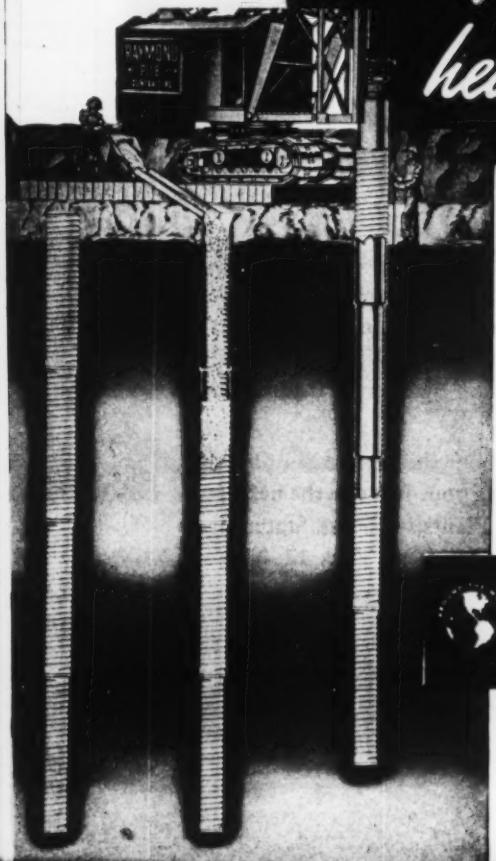
4. COMPOSITE . . . 5. GOW CAISSONS

Raymond installs every type of pile: cast-in-place concrete, precast concrete, steel pipe, wood and H-beam. Raymond operations include underpinning, borings and soil investigations, waterfront construction and harbor and river improvements, and cement mortar lining of oil and water pipe lines 4" to 144" in diameter by the Centriline Corporation, a Raymond subsidiary.

At left, completed Step-Taper Pile. Center, filling the permanent steel shell with concrete after internal inspection. Right, driving the pile with rigid core.

2. STEP-TAPER PILES

FOR *long lengths* WITH *heavy loads*



Raymond Step-Taper Concrete Piles driven with rigid steel cores and heavy hammers are designed to develop high load-carrying capacities at depths to 80 feet. The permanent steel shell maintains the resistance developed during driving. After the shell is inspected internally, it is filled with concrete and cut off at the specified elevation.

You are invited to discuss with our engineers the efficiencies and savings made possible by Raymond's exclusive, original concrete pile designs.

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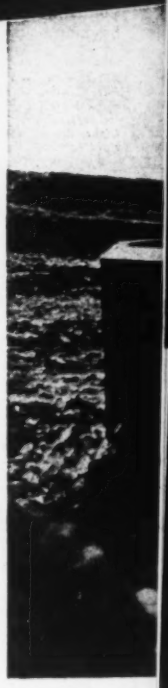
"...ENGINE STILL IN EXCELLENT CONDITION AFTER 7,000 HOURS' OPERATION THANKS TO TEXACO URSA OIL X**"



Taken down after 7,000 hours of rugged service in a rock quarry, this Caterpillar Diesel D-7 bulldozer engine was in excellent condition. Piston rings were all free, wear was so negligible that the crankshaft was reinstalled without any work having to be done on it. *Texaco Ursa Oil X*** was used exclusively in this record achievement.

*Texaco Ursa Oil X*** is detergent and dispersive; it keeps engines clean . . . free from harmful carbon, gum and sludge. This, plus a high resistance to oxidation keeps rings free, ports open, valves functioning properly for better compression and combustion. *Texaco Ursa Oil X*** assures full protection for bearings . . . less wear . . . reduced maintenance costs and fuel consumption.

Let a Texaco Lubrication Engineer tell you about the Texaco Simplified Lubrication Plan and the economies it can bring you. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write The Texas Company, 135 East 42nd Street, New York 17, N. Y.

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every Tuesday night.
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. . . reports Ben Malang, *(right, in photo below)*
General Superintendent,
Chandler Materials Company,
Tulsa, Oklahoma.

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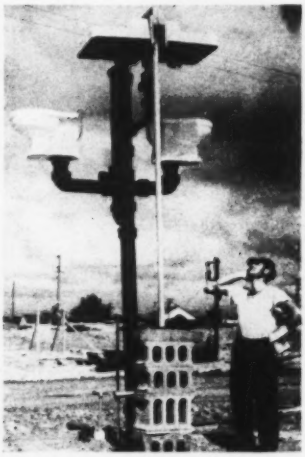
NEWS BRIEFS



WHAT GOES ON HERE?—Why is this plumbing up in the air? An astonished worker stares in amazement at what appears to be outdoor-indoor plumbing. At first, passersby thought this was a new twist in lampposts but closer inspection revealed that the plumbers got ahead of the carpenters at a municipal housing site in St. Paul, Minn. They installed pipe and fixtures complete with washbowls and toilets before the houses were up. One wonders what would have happened if the roofers had gotten there first—Acme photo

• **Sewer-water district** — Ashtabula, Ohio, is looking into the legality of setting up a sewer-water district to include the city and parts of surrounding townships. The district idea is thought to be a solution of the city's problem of financing a new sewage treatment works. Last November voters failed to pass a bond issue for the needed new plant. City Manager D. F. Dunlavy and members of the Board of County Commissioners ars said to be in accord on the district plan provided its legality is proved.

• **Railroads into roads**—The Lackawanna Trail, a discarded railroad right-of-way and obsolete road between Scranton, Pa., and Binghamton, N. Y., bought by Pennsylvania in 1910 for one dollar, is being transformed by the highway department into one of the finest highways in the state. In the meantime, Los Angeles County, Calif., plans to acquire rights-of-way being abandoned by Pacific Electric Co. as it ceases operation of interurban street cars. Eventually a secondary freeway

(Continued on page 13)

You're not the only one concerned!

We know you're not the only one *concerned* with the truck mixer you're buying. That's why Rex Moto-Mixers are designed to *satisfy all* those who are *concerned* with *your* purchase. For example:

your operator is concerned...

Your truck mixer operator can be one of your greatest assets—or liabilities. To be a valuable asset he must have a machine that is fast and easy to operate—one that is free from fatiguing vibration—is built with his comfort and safety in mind. A safe, easy operating, smooth running machine keeps him alert and enthusiastic about customer satisfaction.

He'll satisfy your customers and be a valuable asset when you buy REX

your mechanic is concerned...

He knows his job depends on keeping machines rolling. He wants to keep your customers satisfied with *complete* on-time deliveries. He wants a machine that requires least maintenance and repair—that's easy to maintain and repair . . . whose parts are readily accessible.

He'll help satisfy more customers when you buy REX

your customer will benefit!

When you've satisfied all those concerned with the operation of a truck mixer, it's just natural your customer will get better service. He'll have his quality concrete delivered on time, every time. He'll avoid arguments with inspectors and idle crews. He'll save money.

He'll be a satisfied customer when you buy REX

and, you'll benefit...

You know that keeping your customers satisfied is your most valuable asset in your business success. You want a machine that gives you *lowest maintenance cost, least lost operating time, lowest operating cost.* You want the truck mixer that enables you to give your customer the highest quality concrete at the lowest cost and the best possible service.

. . . WHEN YOU BUY REX

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CONSTRUCTION MACHINERY

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"Your Rammer is the Answer to a Contractor's prayer"

...writes

G. L. "Bud" Plant, Contractor,
SALT LAKE CITY • UTAH

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PORTABLE
ONE MAN OPERATION
FASTER COMPACTION
BETTER COMPACTION
LOWER INITIAL COST
LOW OPERATING COST
EASY TO USE, SAFE!

"THE engineers picked an area with a clay material on which no one had been able to get satisfactory compaction without bringing in select material to mix with the clay," writes G. L. "Bud" Plant, Salt Lake City contractor, in reporting on current construction of an ordnance proving ground in Utah. He continues, "To make a long story short, the 10" lift with two passes was 97.5% compaction . . . *your rammer is the answer to a contractor's prayer* . . . we are putting in an average of about 200 cubic yards (compacted measure) per 9-hour shift per rammer."

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FREE ENTERPRISE — THE CORNERSTONE OF AMERICAN PROSPERITY

News briefs . . .

system may be built over the old transit routes. The first link will be the P.E. short line between Pasadena and San Marino, to be abandoned soon. The cost of the routes will be nominal, and probably the transit company will operate buses on the county-built highways.

• **New St. Anthony's Hospital**—Plans have been approved for the construction of the new St. Anthony's Hospital, Effingham, Ill., to cost $3,000,000 by the Third Order of St. Francis. The new building will replace the hospital burned the night of April 4-5, 1949, with loss of about 85 lives.

• **Delaware highways**—Four new projects, estimated to cost approximately $10,000,000, the largest amount of highway work approved by the Delaware highway department at a single meeting in several years, has just been authorized. Two of the projects are extensions of the dual highway in Kent and Sussex counties; one is an improvement to a highway to be used by traffic over the Chesapeake Bay Bridge now under construction in Maryland; and the fourth is for grading and draining the Lancaster Pike by-pass at Hockessin.

• **To check roadside erosion**—Florida Road Department is turning to pasture farming methods to check roadside erosion. Common Bahia and Coastal Bermuda, fine pasture grasses, are being used with good effect. New wrinkle in getting good grass stands is to cover the area with used tobacco cloth—costs six cents a pound—which holds the moisture and protects the young grass to give it better early growth. Good sodded roadsides lower maintenance costs and leave more funds for other purposes, says Chairman Alfred McKethan.

• **Can't save this old town**—Residents of Newington, N. H., and those in neighboring communities apparently seem likely to lose their fight to save the historic town from being wiped out by construction of the $46,588,000 Air Force jet bomber base at the Portsmouth Municipal Airport, since the Armed Services public works construction bill, including the Newington project, has been passed by the House of Representatives. Opponents of the project brought out that the new base would embrace about 5,000 acres of land in the Portsmouth-Newington area, and would wipe out more than half of the 328-year-old town of Newington.

• **N. W. water development**—Under auspices of the Columbia Basin Inter-agency Committee, a series of public hearings to discuss the committee's $3½-billion plan for water development of the Pacific Northwest will be held this fall at Spokane, Wash.; Boise, Idaho, and Portland, Ore. The purpose of the hearings, announced by Committee Chairman Brig. Gen. O. E. Walsh, North Pacific division engineer, Corps of Engineers, is to determine public reaction to the committee's development plan before it is presented to Congress. The provisional plan calls for expenditure of $570,700,000 a year over a period of six years, with the federal government paying a total of about $3½ billion, and five northwestern states providing the balance.

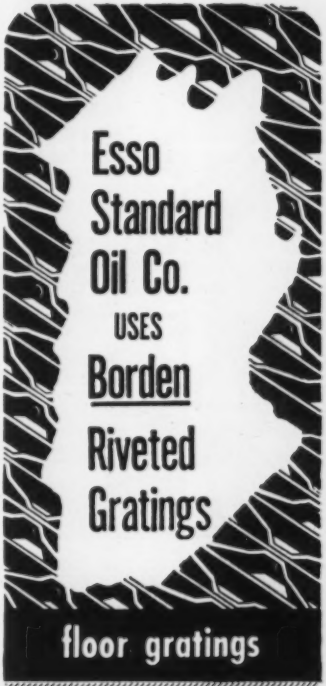
• **Good day's work**—V. N. Holderman & Sons, Inc., Columbus, Ohio, on one day recently laid a strip of cement road a mile long, 12 ft wide, and 9 in. thick. It was on U. S. Route 33 near Canal Winchester, Ohio. The work called for 11,622 bags of cement.

• **Big conservation district**—An 11,550,000-acre soil conservation jurisdiction, called the Mojave Desert District, has been formed in California. Created by a vote of 947 to 777, it is the second largest in the United States. Its formation nearly doubles the acreage in California conservation districts.

• **Painless bill paying**—The water department of Toledo, Ohio, has ordered plans for a 9×16-ft masonry building, to cost $10,000 with a bulletproof slotted window, so that motorists can pay their water bills without looking for a parking space in the congested Civic Center area.

• **Flood protection**—The federal government has turned over to Newport, Ky., control of the completed $8,000,000 flood-protection project. The floodwall provides protection from floods in the Ohio and Licking Rivers up to a stage of approximately 84 ft.

• **Lightning repeats itself**—The lightning disaster on a construction job at South Boulder Creek Dam, Colo., Aug. 24 (ENR Sept. 13, page 29) was not the first of the kind. In ENR June 24, 1948, was recorded the fact that lightning detonated a charge of dynamite in a Pacific Gas & Electric Co. tunnel project in northern California, killing one workman and injuring six others. The bolt was conducted by the rails of a narrow-gage railway and set off a partially prepared charge in an adit of the tunnel.



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- permits perfect distribution of loads
- excellent for rolling loads and walking

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ELIZABETH, N. J.
Southern Division — Leeds, Ala.
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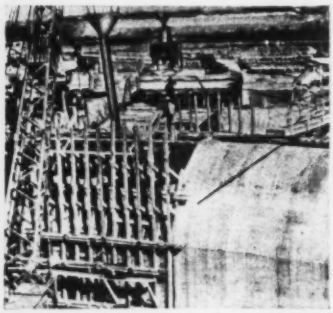
What's U. S. Rubber doing on today's big projects?

U.S. BULL LINE AIR HOSE is practically standard for tunnel contractors. Also used for compressor work, acting as manifold line supplying compressed air to portable tools.



CONTRACTORS on the big dam construction job in the Middle West used several varieties of U.S. Rubber Hose, to carry air, water, oil and cement. Workmen find "U.S." hose flexible, rugged and easy to handle.

On almost every phase of construction, "U.S." products are at work. Hose of every type, in dozens of specifications, packings from the most complete line in industry. Hydron absorptive form linings, "U.S." flexible form strips, conveyor belts large and small, transmission and elevator belts, and the remarkable U. S. Rainbow V-Belts with the unique Equa-Tensil Cord Section ...these are some of the many "U.S." items contractors rely on to keep the job moving faster. For further information, write to address below.

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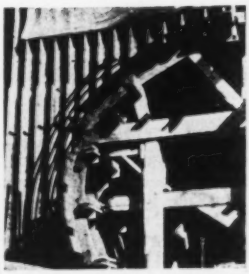

TUNNEL SECTION of a large dam in Texas. Hydron form linings, a "U.S." development, provide a smooth, pit-free surface, enabling the concrete to withstand the grinding action of high-velocity, silt-laden waters.

UNITED STATES RUBBER COMPANY

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The Power Plant illustrated below is further evidence of a design trend and the prominent place Insulated Metal Walls occupy in present day construction . . . it is typical of fourteen structures, including two complete industrial plants, presently under construction—and dozens of others in the planning stage. The exterior wall surfaces of this building are Stainless Steel throughout . . . permanent, firesafe material requiring no maintenance whatsoever. Mahon Insulated Metal Walls are available in three distinct exterior patterns as shown at left. Walls may be erected up to 50 feet in height without horizontal joints. Thermal properties are excellent—insulation provides an overall "U" Factor equivalent to that of a conventional 16" masonry wall. Mahon Insulated Metal Walls, together with a Mahon Steel Deck Roof, provide the ultimate in economy, permanence, and firesafety in modern construction. See Sweet's Files for complete information, or write for Catalog No. B-52-B.

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Detroit 34, Mich. • Chicago 4, Ill. • Representatives in Principal Cities

Manufacturers of Insulated Metal Walls; Steel Deck for Roofs, Floor and Partitions; Rolling Steel Doors, Grilles, and Underwriters' Labeled Rolling Steel Doors and Fire Shutters.

MAHON

CMP

and Ryerson Reinforcing Service

As you may know, fabricated concrete reinforcing bars have been designated a Class A product by the National Production Authority. This new designation went into effect October 1, 1951.

The most immediate effect of this ruling on our operations is that we must now obtain allotment numbers from our customers to cover every pound of reinforcing bars shipped from our stocks.

Previously reinforcing bars, as a Class B product, were not subject to blanket controls and some "free" steel was left for authorized construction after rated orders had been filled.

REQUIRED FOR CMP STEEL ALLOTMENTS

The new CMP regulation (No. 6) states that no person may commence construction or obtain materials to complete construction already underway without first obtaining an authorized construction schedule (and related allotment number) for such construction from the NPA. The only exceptions to this authorization procedure are some instances in which prime contractors may self-authorize requirements for small amounts of construction steel.

For complete details we urge you to get a copy of Regulation No. 6 at your local NPA office. This office will also furnish copies of Form CMP-4C on which prime contractors make application for an authorized construction schedule.

Of course, the new status of reinforcing bars will have no effect on the over-all supply; so our stocks will probably not show any great improvement. However, tighter restrictions may make it a little easier for those who get authorization to find steel. We at Ryerson will certainly continue to help whenever we possibly can.

HI-BOND RE-BARS

First of the new high-strength bars, Hi-Bond reinforcing gives stronger construction and increased resistance to the formation of tensile cracks. Hi-Bond's greater bonding grip is test-proven. Every bar meets or exceeds ASTM spec. A. 305. Though not always available today, it will pay to make Hi-Bond part of your plans for tomorrow.

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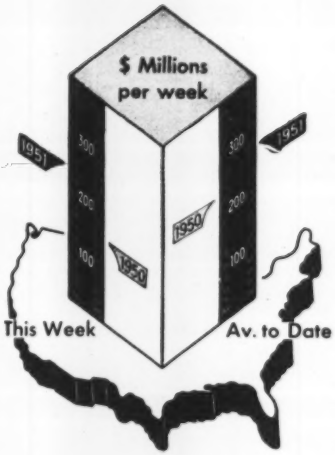
THE CONSTRUCTION WEEK

STEEL SURPRISE—Some projects caught in the wringer of reduced structural steel allotments for the fourth quarter may get some more steel after all. There is strong reason to believe that the military can't take up its entire allotment because Congress has not appropriated the money for fiscal '52 jobs. As much as 100,000 tons may be available for reallotment.

CRITICAL EDUCATION—The National Production Authority has told the Office of Education that it will have an allotment of 81,000 tons of steel for school construction during the first three months of next year, compared to the 194,000-ton allotment for the current quarter. Nearly all of the 81,000 tons has already been committed to continuing school projects.

EXPRESSWAY DECISION—Michigan's Supreme Court has upheld plans for an $80-million bond issue to speed completion of the Edsel Ford and John C. Lodge Expressways in Detroit. The decision in a test suit will help cut construction time of the expressways from 15 to five years by pledging the city's future share of gas and weight tax revenues. The opinion said there is nothing unfair or confiscatory in an agreement signed by State, City and Wayne County officials approving 21-year bonds—the state to pay $2.5 million a year, the City and County $1.25 million a year each toward retiring the issue. Cost of completing the expressways is estimated at $134 million, with the government providing the $54-million balance.



CIVIL DEFENSE RHUBARB—In a statement to the Senate Appropriations Committee, the American Municipal Association charges a double cross on civil defense appropriations for 1952. On the promise of federal assistance, states and their municipalities formed civil defense organizations enlisting a million volunteers, and preparing extensive programs. After setting up this framework, AMA says Congress has pulled the props out by failing to provide money for its share of the bill. The Appropriations Committee now has added $32 million to civil defense funds, but the total is still $503 million short of Administration requests. The committee recommends $97.6 million.

Contracts by type of work

	This Week	Cumulative 41 wks 1951	1950	% chge
Waterworks.	$3.7	$167.9	$182.8	−8
Sewerage ..	5.9	265.8	214.7	+24
Bridges	4.0	628.1	392.5	+11
Highways ..	28.0	968.6	1,012.8	−4
Earthwork, Waterways.	0.8	428.5	333.4	+29
Buildings:				
Public	44.9	1,790.4	1,338.3	+34
Housg., pub.	2.6	562.6	240.9	+134
Housg., priv.	60.7	1,570.0	2,734.9	−43
Commercial	10.1	520.9	784.6	−35
Industrial..	53.6	3,426.5	1,232.2	+178
Unclassified .	28.3	1,419.9	1,021.9	+39
Total	**$241.9**	**$11,388.3**	**$9,409.0**	**+21**

NOTE: Minimum size projects included are: Waterworks and waterway projects, $34,000; other public works, $60,000; industrial buildings, $82,000; other buildings, $300,000.

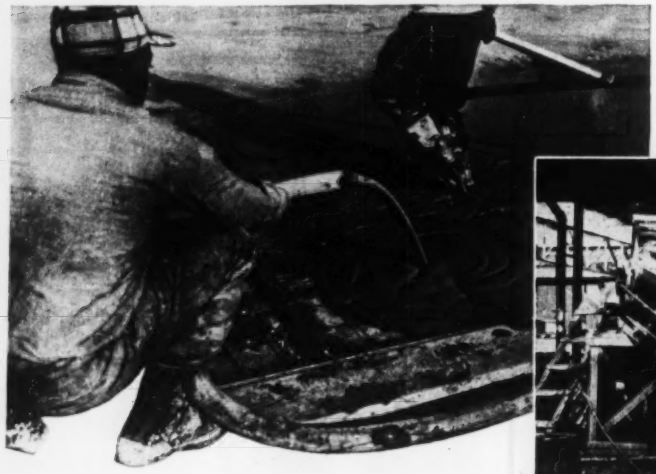
ENR COST INDEX

Index Base = 100	1913	1926	1949
Constr. Cost..Oct. '51	546.48	262.69	114.56
Bldg. Cost...Oct. '51	403.40	218.03	114.67
Volume ...Sept. '51	447	182	129

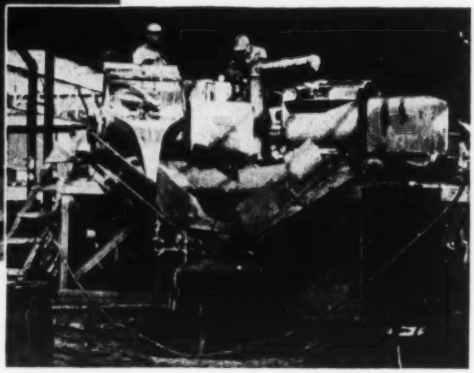
PRESTRESSING IN NEW YORK—Wyoming County, N. Y. (near Warsaw), will build the first prestressed concrete bridge in New York State according to designs of the Freyssinet Co. of New York City—which will also supervise construction. The bridge (over a creek) will consist of four 63½-ft T-bars cast in place, to provide a two-lane, 22-ft wide structure. Prestressing will be by 8 cables per beam, each cable consisting of 12 wires 0.192 in. dia. Beams are to be 33 and 36 in. deep, have a 7½-in. web, 30-in. flange, spaced 7 ft on centers. Austin Wellman, county engineer, is in charge.

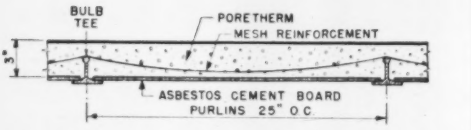
AT LONG LAST—The Chicago District of the U. S. Corps of Engineers announced last week it had completed negotiation for construction of additional facilities at Scott Air Force Base, Belleville, Ill. Previous bids have been twice rejected because they were 50% over estimates. Contractors blamed bad labor conditions—featherbedding, slowdowns, and other difficulties for the high bids (ENR Aug. 30, p. 24). Last week Engineers reported award of the contract to Lieb Bros., Inc., of Newark, N. J. for $13.5 million. How this compares with Engineers' estimates is a carefully guarded secret.

3-Inch 'Incor' Icing *ON A 1½-ACRE CAKE*



'INCOR' SOAP-FROTHED SLURRY USED IN LIGHTWEIGHT, INSULATING ROOF-DECK





Owner: **HENRY PAPE, INC.**, Warehouse, Garage & Office Building, Glendale, L. I.

Architect: **WALTER MONROE CORY**, New York

General Contractor: **W. J. BARNEY CORPORATION**, New York

Roof Contractor: **PORETE MANUFACTURING COMPANY** North Arlington, N. J.

'Incor', 4400 bags: **JAMAICA PARAGON PLASTER CORP.**, Jamaica, L. I.

● Here is a roof fill that fills the bill—economical, lightweight, fireproof, high insulating value.

On this well-designed building, the 63,000 sq. ft. of Poretherm roof-deck consists of ¼" asbestos-cement sheets, supported on lower flanges of sub-purlins, and a fill of 3" poured-in-place, soap-frothed 'Incor' slurry —6" over refrigerated area.

The concrete on hardening bonds to the asbestos-cement sheets, providing ample strengths for safe working loads. Insulating value of 3" slab is equal to 1½" cork; weight, 10.5 lb. per sq. ft.

For this roof fill, slow-moving mixer blades fold a froth of liquid soap, water and air into the 'Incor'* slurry, to a smooth, even consistency. Then the mix is chuted into a pneumatic dispenser, kept in continuous operation by two mixers.

'INCOR' 24-HOUR CEMENT provides greater strength in less time, permits workmen to get on the roof sooner, thereby speeding completion. Another example of know-how, sparked by ingenuity, taking full advantage of dependable 'Incor' performance.

*Reg. U. S. Pat. Off.

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LONE STAR CEMENT, WITH ITS SUBSIDIARIES, IS ONE OF THE WORLD'S LARGEST CEMENT PRODUCERS: 17 MODERN MILLS, 125,000,000 SACKS ANNUAL CAPACITY

1952 CONSTRUCTION VOLUME: LOWER

Defense officials expect a big drop in construction volume next year. Latest estimate is that work put in place next year will total about $26.5 billion. That's about 9% less than the latest estimate for this year, and it's 5% below the figure for 1950. But it's still a very good year.

Physical volume—bricks and mortar, with price changes eliminated—will go down even farther, according to the reports of Mobilization Director C. E. Wilson. The biggest drop will come in the first half, with volume expected to rise later on. Latest figures indicate that officials expect 1952 physical volume to balance out at about 87% of the total for 1950.

The cutback got started in August, when the value of work put in place fell below the corresponding month of 1950 for the first time this year. Physical volume was down 5% or so. Large cutbacks were showing up in types of building hit hardest by defense-spending on new private housing units was down 33%, commercial building down 6%. ENR contract figures show the trend will continue. For the first 39 weeks of 1951, new contracts for commercial buildings were off 33% from last year, private housing projects off 45%.

• **Stumping the Experts**—But builders can beat the government goals. They can do it if they can get around shortages of materials, because there is no shortage of work to be done.

There are at least two ways to beat the government goal. One is by substituting other materials for steel. Substitution offers a chance to keep volume up in fields where the steel shortage hurts most—commercial buildings, small industrial buildings, schools, roads.

Housing offers the other big chance to beat the government goal. Government estimates are based on 850,000 housing starts in 1952. If builders can surpass this goal—as they are surpassing it this year—total volume of construction will be much higher. But here again there is a substitution problem. Copper is one of the scarcest and most important defense metals. Probably no more than 850,000 housing units can be built next year unless copper use is drastically reduced and substitutes used wherever possible.

• **Materials**—Builders can't expect much relief on key materials in 1952. In fact, shortages may get worse, and last longer, than has been expected.

Structural steel will be even tighter in the first quarter of 1952 than it is now. It will stay tight all year, according to the latest estimates from Washington. Copper for civilian use will be scarce all year, and in 1953 as well.

Now changes in the defense program may stretch out the mobilization program, make key materials harder to get even after 1952. The goal for expansion of the Air Force is being raised from 95 wings to 140-150 wings. Washington is considering an increase of several billion dollars a year in spending for atomic energy. These and other possible changes in the defense program may keep military buying very high for several years. That would mean further delay in the return to a normal supply of metals for civilian use.

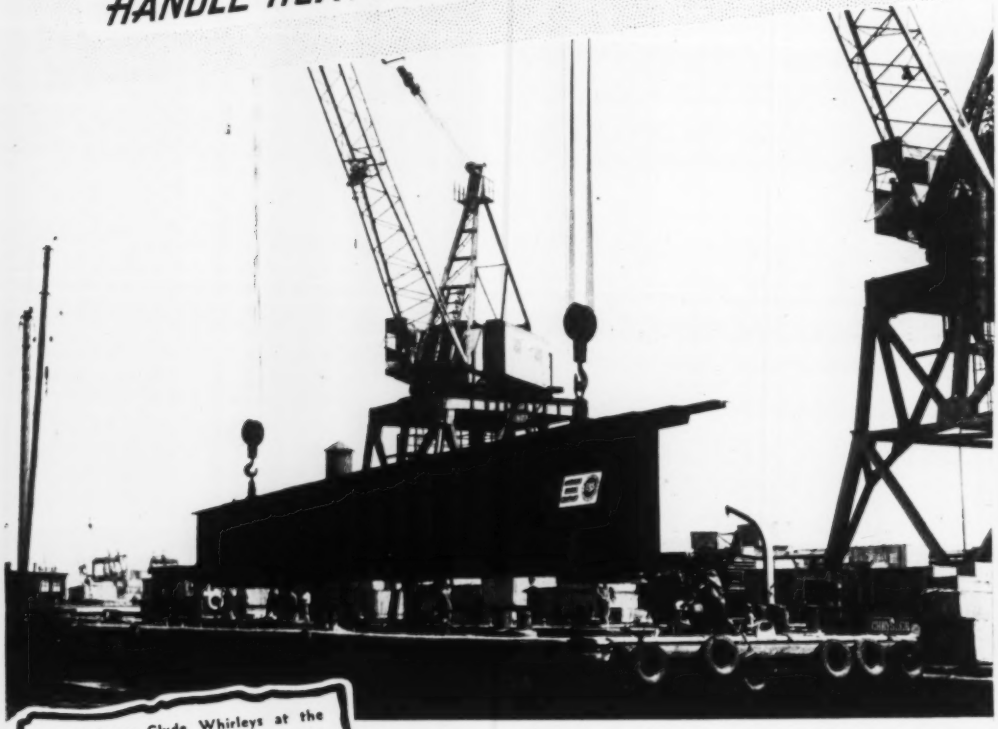
• **Inflation**—Construction wages will continue to rise. A 5% gain is likely over the next year. Other wage increases will push up costs of many manufactured construction materials—steel, copper and heavy machinery are possibilities. As a result, construction cost indexes may go up by 5% or more.

Prices of some materials, like lumber, may fall a little if construction volume goes as low as government officials expect. But rising costs of producing materials will tend to limit any price drops. And scarcities of materials and labor for heavy construction work—plus the rush to get jobs finished—all will tend to push real costs even higher than the indexes show.

THE MIGHTY MUSCLES OF...

2 CLYDE WHIRLEYS

HANDLE HEAVY LOADS FOR LACKAWANNA



Two 60-ton Clyde Whirleys at the Lackawanna Hoboken Terminal save time, expedite "big stuff" shipments for customers of the Lackawanna Railroad. Working in tandem, the Clyde Whirleys deftly transfer a 104-ton steel girder from flatcar to lighter. The 125-ft. girder is one of two such giants earmarked for the mighty Hackensack River Bridge on the New Jersey Turnpike.

The mighty muscles of Clyde Whirleys handle extra big loads with speed and safety.
Their hoists, specially designed for Whirley service, permit precision load control through Clyde's easy acting, large diameter, internal band frictions. Extra braking action provides additional safety at all times. These and other Clyde features combine to assure cost cutting, production boosting operations.
If you handle heavy loads and need fast, low-cost, dependable operation . . . call on Clyde. Trained, competent engineers are available for free consultation on all your material handling needs.

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CLYDE IRON WORKS Inc.

DULUTH MINNESOTA

SUBSIDIARY OF BARIUM STEEL CORP.

New hope for sludge disposal

IF THERE IS a "hot-stove" league in the sanitary engineering fraternity, we know what it should be talking about this winter: John F. Laboon's success in handling concentrated, undigested sludge in his pilot plant at Pittsburgh.

Those in the know have already been doing a lot of talking—and thinking—some bullish, some bearish. Among the interested have been the manufacturers whose equipment may or may not figure in the handling of the concentrated product. Attitudes have ranged from skepticism to enthusiasm.

Now the facts are out. Experience to date with this previously unmanageable sludge product is reported on p 30. And Mr. Laboon this week described his methods and results to the Federation of Sewage and Industrial Wastes Associations, meeting in St. Paul. These facts will survive the discussions that will ensue: (1) At its pilot plant outside Pittsburgh, the Allegheny County Sanitary Authority has consistently been able to concentrate sludge to 20% solids. (2) An inexpensive pump has been hit upon that will handle this product. (3) Metcalf & Eddy, consultants to the authority, have been sufficiently convinced by production records and pump performance to undertake design of a major treatment plant based on the concept of concentrating sludge—rather than digesting it.

No one—Mr. Laboon nor anyone else—would claim this to be the last word in waste disposal. Like so many other advances, it is only good where it can be applied with resulting economics over other means. But it stands out as a major advance in the phase of waste treatment most in need of advancement—sludge disposal.

Public works construction

PUBLIC WORKS DEPARTMENTS—stymied on many of their construction projects—ought not to let an attitude of frustration keep them from the jobs that can and should be done right now.

Current and future designs should be scanned for possible reductions in the use of hard-to-get materials. New concepts of designs utilizing new materials and construction methods aimed at conserving steel and other critical materials not only offer a continuing challenge to designers of public works but, in some instances, they may prove to be even more economical than conventional designs.

Then there is the matter of long-range planning. Such planning is as essential now as ever before. Not only will it assure that plans and specifications are ready when the materials situation eases, but its roster of projects will provide a measure—for all to see—of the amount of essential construction needed for the safety, convenience and welfare of the community.

Nor should stage-construction of those improvements for which materials can be secured be overlooked. For example, foundation work, requiring relatively little steel, can usually be carried forward to completion under present conditions. Then when materials become available for the above-ground construction the project can be completed in a relatively short time. This type of reasoning can also be applied to major highway work where grading can now be carried on, while waiting for materials for the roadway and bridges.

In view of present and anticipated shortages of construction materials, it takes courage to award initial contracts for large sewers, waterworks, highway and other public works improvements requiring many months or even years to complete. But without such courage, coupled with a determination to implement and prosecute the work as rapidly as materials become available, states and cities will again be faced with the old bugaboo of too little and too late in their improvement programs.

Not in the bag yet

DON'T EXPECT DIRT TO FLY SOON on a St. Lawrence ship canal north of the border as a result of the understanding reached last week between President Truman and Prime Minister St. Laurent in Washington. President Truman is reported to have said that he still is in favor of joint construction of the seaway and power project, but that if Congress does not act to assure an early start on the work he will support the plan for Canada to build the project alone.

From all appearances, Congress is in no mood to give President Truman that assurance of an early start. And we surmise that the Canadian Parliament may be equally lacking in enthusiasm for the Prime Minister's proposal when it comes to realize that it will have to foot the bill for the entire cost of the waterway from Montreal to Lake Ontario under the Prime Minister's plan instead of paying considerably less than half the cost under the 1941 agreement.

Another aspect of the St. Lawrence developments that seems to indicate that the Truman-St. Laurent meeting of minds is just part of the pressure on Congress relates to the power situation. If Congress does not approve the St. Lawrence project, the only way in which the power dam at Barnhart Island that Ontario wants so badly can be built would be for the New York State Power Authority to build the part lying in New York State. That is just what President Truman and the empire builders in Washington do not want.

So many obstacles stand in the way of schemes for bypassing Congress as to indicate that none can succeed.

DURAPLASTIC Aids Proper Concrete Placement in World's Biggest Bus Terminal

● To get a more uniform, more workable mix for New York City's new $24,000,000 bus terminal, Turner Construction Company used Duraplastic* air-entraining portland cement—31,000 barrels in all. Duraplastic requires less mixing water for a given slump. It gives a more plastic mix. Such mixes aid proper placement... result in an improved surface appearance.

The greater plasticity of Duraplastic concrete is due to billions of tiny air bubbles entrained in the mix. They minimize water gain and segregation. As a result, finished concrete made with Duraplastic is also fortified against the effects of freezing-thawing weather.

General Contractor: Turner Construction Co., New York, N. Y. Ready-mixed concrete supplied by Metropolitan Sand & Gravel Co. New York, N. Y.

YET DURAPLASTIC* COSTS NO MORE

It sells at the same price as regular cement. Complies with ASTM and Federal Specifications. For free booklet telling how Duraplastic can help you on your next job write: Universal Atlas Cement Company (United States Steel Corporation Subsidiary), 100 Park Avenue, New York 17, N. Y.

*"Duraplastic" is the registered trade mark of the air-entraining portland cement manufactured by Universal Atlas Cement Company

OFFICES: *Albany, Birmingham, Boston, Chicago, Dayton, Kansas City, Minneapolis, New York, Philadelphia, Pittsburgh, St. Louis, Waco.*

ENR-D-131

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Makes Better Concrete at No Extra Cost

"THE THEATRE GUILD ON THE AIR"—*Sponsored by U. S. Steel Subsidiaries—Sunday Evenings—NBC Network*

ENGINEERING NEWS-RECORD

OCTOBER 11, 1951 VOL. 147 NO. 15

Cement scarce as industry expands

Annual battle starts in cold weather belt to finish construction before winter arrives

By J. Roland Carr
Associate Editor

CHICAGO—With winter approaching, the battle is on in many areas to get enough cement to finish construction before snow flies. This is no unusual occurrence, but rather the usual pattern in the cold weather belt.

Several factors have combined to tighten the cement situation this fall. Large street and highway projects involving concrete construction were late in getting underway last spring, due either to bad weather or slowness in letting contracts; many defense production facilities are reaching peak demand for cement as well as other materials; housing and apartment construction instead of falling off sharply as predicted last spring (ENR Feb. 1, 1951, p. 24) are enjoying another boom year; and both industrial and commercial construction are going forward at a fast tempo.

• **Shipments up**—What are the cement mills doing to meet these demands? For one thing, they have substantially increased their production by modernization and enlargement of existing plants, and the construction of new ones. Cement shipments are running about 10% ahead of last year.

As it always does in the cold weather belt, the coming of winter will enable supply to catch up with demand. Then it will be a question of filling storage silos and planning on how best to take care of next year's cement requirements.

In this connection, manufacturers are handicapped by the fact that they get little or no advance information on the amount of cement that will be needed for new defense production construction projects. Neither do they know where many of them will be located. This is a reversal of procedures before and during World War II when cement manufacturers were consulted in advance of the awarding of large defense contracts, to see if sufficient cement could be made available.

Under our present economy, public and private construction are trying to go forward with their plant expansion and new construction—in spite of building restrictions—to maintain a high level of production. At the same time defense production construction may require as much as 60 million barrels of cement in 1952.

• **What lies ahead?**—This all adds up to the fact that a lot of cement will be needed for the rest of this year and 1952. Perhaps an insight into what lies ahead for the cement industry is reflected in what manufacturers are thinking and doing at the present time.

Cement manufacturers, in general, are leary as to just what effect the Controlled Materials Plan will have on the demand for cement. Up to now the CMP has not been in effect long enough for manufacturers to fully appraise what will be expected of them in servicing defense orders.

Should building restrictions and CMP regulations continue to get tighter, some representatives say that a surplus of cement can develop almost over night.

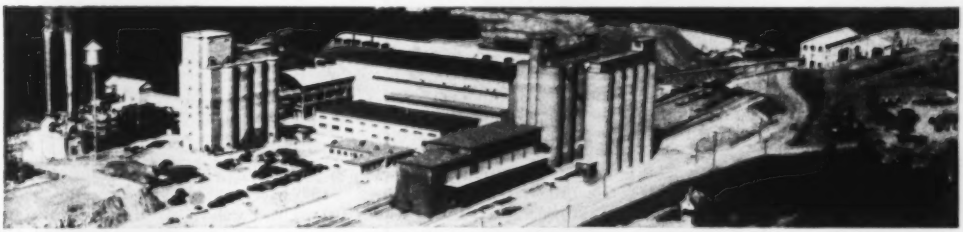
As it is, there has been a noticeable falling off of concrete construction during the past several weeks in small communities throughout the South and Southwest. This may be the result of a psychological reaction, contend some officials in the cement industry. Possibly the building regulations are becoming so complex that small builders don't want to bother with trying to get cement and other materials.

• **The Texas market**—The demand for cement in Texas continues strong, and is expected to increase next year due to the tremendous construction activity in highways, and in the chemical, industrial and petroleum industries. Some of this highway and commercial construction had to be deferred this summer during the peak demand for cement.

Although some authorities predict that the total national dollar volume of construction in 1952 will be 10% below this year (ENR Oct. 4, 1951, p. 28), chances are that more cement will be needed next year in the South and Southwest.

There are two main reasons for this prediction. First, the continuing trend of constructing new manufacturing plants and distributors outlets in those areas will call for substantial new construction. Secondly, roughly 65% of the 1952 Department of Defense construction program will be south of the Mason-Dixon line.

One manufacturing company, with an annual production capacity of 12 million bbl, currently is shipping 40% of its output to Texas for defense rated construction.



NEW PRODUCER—Lone Star Cement Corp. is adding two new plants to its productive capacity this year. The one above at Roanoke, Va. began shipments June 15 (ENR June 7, p. 26). Another like it near Sweetwater, Texas will begin shipping about Dec. 15. These two bring the company's total to 17, boost its combined capacity to over 31 million bbl annually.

• **Defense production needs**—Just how much cement will be needed for the 1952 fiscal year of defense production is anybody's guess. But if we take the conversion factor of barrels of cement to dollar volume of military construction, compiled in recent years, and adjust it for today's prices, it is reasonable to assume that 20 bbl of cement will be needed per $1,000 of construction.

Applying this factor—which is considered conservative—and assuming $3 billion dollars of defense construction in this country for fiscal 1952 (ENR June 28, 1951, p. 23), a reasonable assumption is that 50 million to 60 million bbl of cement will be needed to complete our 1952 program.

• **Plant modernization**—For the past five years modernization of cement plants for greater efficiency and increased output has been on the upswing. This trend is expected to continue since many of the plants are old and usually greater returns can be expected from plant modernization and expansion than by building new ones.

In the past, it has been the practice to build up sufficient backlogs of finished cement to permit shutting down a plant for overhaul, maintenance and modernization. But under the present stress of producing to the maximum, many plants keep on at full production until they break down. Then it is a problem of securing replacement parts which often is extremely hard to do.

• **Winter storage**—Up until a few years ago it was common practice for some mills to slow down or even shut down during the slack winter season. They did this for two reasons: (1) a sharp falling off in demand for cement as concrete construction slackens due to freezing weather and (2) lack of storage facilities for the finished cement.

Within recent years this picture has changed appreciably. Mills located in the cold-weather belt have increased their storage of either clinker or finished cement, or both, to permit normal operations throughout the winter. One example of this is Medusa's cement plant at Dixon, Ill. With its 500,000-bbl storage capacity for finished cement, it can operate at full normal production throughout the winter.

Even with their added storage capacities, some mills have quite a problem meeting their fluctuating demands. During the heaviest part of the construction—from May to November—mills run 24 hr per day, 7 days per week. With the coming of heavy fall rains and early winter freezing, the demand drops off sharply, and sometimes without warning.

How widely this cement demand fluctuates is shown in the U. S. Bureau of Mines figures on cement shipments in the United States and Puerto Rica (in thousands of barrels).

	1950	1951
January	9,632	12,237
February	9,824	11,294
March	14,669	17,692
April	18,424	20,953
May	22,834	24,892
June	24,749	24,935
July	23,167	24,266
August	25,144	.....
September	22,910	.....
October	24,167	.....
November	19,791	.....
December	12,477	.....
Total	227,788	

Source: Mineral Industry Surveys—Monthly Cement Report No. CP362 Supp. A., Bureau of Mines, U. S. Dept. of Interior.

Monthly mill shipments during December of last year and the first two months of this year were only 50% of the average monthly shipments during May, June and July of this year. (No Bureau of Mines figures are available on shipments since August 1).

• **Rise seen**—Cement shipments during August, September and October of last year, held up pretty well with the peak month of August (25,144,000 bbl).

Total shipments of cement during the first 7 months of this year (136,300,000 bbl) were 10½% above the same period last year when shipments totaled 123,300,000 bbl.

Projecting this rate of increase over the remainder of this year—which may be considered conservative in view of the current high demand—total shipments from the mills for 1951 for U.S. and Puerto Rico consumption may well reach 250,000,000 bbl.

• **The farmer problem**—The midwestern farmer, although not as big a cement customer this year as in the past few years, still presents a problem in distribution and supply.

The farmer has always been able to get cement when he needs it, so he doesn't buy until he is ready to build. And the rub comes, from a distribution standpoint, that he usually doesn't get around to making extensive improvements until his crops are laid by, or harvested. This means that the farmer's greatest demand for cement coincides with other peak demands in late summer or early fall.

• **The Chicago picture**—Cement supplies in Chicago and the surrounding area admittedly are tight—with consumers and distributors painting a darker picture than manufacturers.

With good construction weather in prospect well into November, the situation is expected to worsen before it gets better. In fact, consumers and suppliers agree that supply and demand probably won't balance out until construction is slowed down by rainy or freezing weather.

The first indication that cement was getting in tight supply appeared between the 10th and 15th of September. During that month the supply of cement was only 90% of the demand, according to Henry Crown, chairman of the board of directors, Material Service Corporation—largest cement distributor in the Chicago area (from 2 million to 2.5 million per year).

Depending on the weather, the prospects for October are even worse, according to Crown, who foresees the possibility of available supply dipping to 50% of the demand during that month.

Some cement manufacturers in the Chicago area, however, are far more optimistic. During the early days in October shipments from some mills were only 10 days to two weeks behind schedule. On October 2, the Chicago sales office of one large manufacturer received 90 telephone calls from dealers and construction contractors; all wanting cement. Little emergency relief, however, could be offered these customers since this company operates on a customer quota allocation basis.

• **May get worse**—Although this situation is expected to get somewhat worse in the next few weeks, a sudden run of bad weather would enable deliveries to catch up quickly with their schedules.

Factors causing this nip-and-tuck battle between supply and demand for cement in the Chicago area include: a sustained high level of apartment and private home construction; tremendous industrial construction and plant enlargement, much of which is the result of big government contracts for military supplies; and large highway construction programs in the surrounding area that were started so late last spring that their peak demand for cement wasn't reached until late this fall.

• **No gray market**—One bright spot in the picture, however, is the fact that to date no gray markets have appeared for cement in the Chicago area. This seems unusual in view of reported jacked-up prices in some large municipalities, but it probably is due to the refusal of purchasers to become panicked into paying premium prices. Wholesale prices of bulk cement in Chicago have risen 11% during the past year and bagged cement, 10%.

In some localities outside of Chicago there is a relatively fine line between supply and demand. Some dealers with substantial inventories are beginning to worry that cold weather will catch them with excess cement which they will have to carry through the winter.

Midwest flood aid bill reduced to $113 million

WASHINGTON—The $400 million to help repair flood damage in the Midwest asked by President Truman, was chopped down to $113.4 million by the House Appropriations Committee last week.

The committee refused to approve the President's request for $190 million for direct indemnity payments to persons who lost their homes or other property in the floods. Also turned down was his request for a $50 million flood insurance fund.

Most of the $113.4 million recommended would be for long-term loans. For direct relief under the President's emergency disaster fund, only $5 million was approved.

• **Total up**—The new money in addition to money now available would bring to $257.5 million federal funds for rehabilitation of flood areas in Kansas, Missouri, Oklahoma and Illinois, the committee said. A major part of this money will show up in new or repair construction.

Indemnity to flood victims for damage to real estate and personal property up to 80% of loss but not over $20,000 would be a departure from the present concept of government responsibility, the committee pointed out.

• **Highway funds**—A bill authorizing an additional $10 million for repair of highways in flood-damaged areas was passed by the Senate and went to the President this week.

Backers of the bill said cost of repairing flood damages on the federal-aid road systems in Kansas and Missouri is estimated at $13.5 million. The Federal government can pay up to half of this cost under the emergency fund approved this week.

H-bomb funds slashed

"Disturbed by reports of waste and inefficiency," the House Appropriations Committee yesterday recommended a cut of $284.2-million in funds proposed for the Savannah River atomic plant.

Reduction of the supplemental funds to $200 million "will in no way retard the construction progress of this important project," the House group said.

The AEC cut was included in a supplemental money bill which also made a reduction of $357 million in funds budgeted for defense construction and slashed $24.3 million out of the $25.5 million program of the Federal Security Agency for defense housing and community facilities.

ANOTHER SHORTAGE—Lack of engineer manpower caused the Virginia State Highway Department to seek private consultants' services for $40 million in bridge and highway construction projects in the past two years. Currently, the department's design and drafting division, pictured above, that operates with a normal capacity of 215 has only 86 employees. Chief reason for the shortage is attributed to the low pay scale for starting engineers on the state payroll.

Steel shortage curtails highway jobs

NEW YORK—Highway projects continued to fold this week in the face of cutbacks in the supply of structural steel for roadbuilding under the Controlled Materials Plan.

In Denver, Colo., State Highway Engineer Mark U. Watrous reported his department has been offered all the black market steel it can use. He charged the National Production Authority program for steel allocation has caused the black market condition. He said the steel was offered at prices 50% and more above what the department is paying.

Mr. Watrous also reports he has received letters from U. S. importers in France, England, Germany, Italy and Japan which state that his department can purchase imported steel, but purchases must be made before ships reach the 12-mile limit outside the U. S. Once inside, the steel comes under NPA control.

• **Parts shortage**—Private contractors in Denver say a gradual slowdown in construction of highway and sewer projects is being caused by a shortage of replacement parts for trucks, trailers, shovels, blades and caterpillars.

J. Edgar Jones, president of the Light-Heavy Constructors Assn., said: "The government has prevented stockpiling of parts for heavy equipment until it has reached a point where defense projects in this area will be affected."

• **Conditions widespread**—Conditions in Denver are prevalent across the country. Reports from every section show the squeeze is on school projects and other public works also. Among the notable reports which have been received are these:

Ray F. Smock, Pennsylvania's secretary of Highways told the Pennsylvania Automotive Assn. that his state needs 140,000 tons of steel for its 1952 highway construction, but preliminary allocations call for only 28,000 tons.

Chief Highway Engineer William H. Rogers, Jr. of the North Carolina Highway Department said the Highway Commission has enough work underway to use all the steel it has been allocated for the next 15 months and that the state faces "a critical situation" in obtaining what it needs. He said the Commission has received only about half the steel it has been allocated during the present period.

• **Other jobs**—The Associated General Contractors of Minnesota made a survey which shows that start of more than $10 million of construction of schools, hospitals, and public works has been prevented by failure of government agencies to allocate steel and other controlled materials.

Multi-billion construction program for atomic energy plants seen in 1952

Proposed developments under Atomic Energy Commission to exceed any undertaking of its type; size and speed will be important

WASHINGTON—An added $5-to-$6-billion plant construction program for the Atomic Energy Commission should get under way early in 1952. Events of the last few days make the program an almost sure bet.

In both size and speed the new construction program will eclipse everything done to date for atomic energy in this country. If hopes are realized, the entire $5-$6 billion will be invested in new plant by early 1954. That schedule is both big and fast in comparison with the $4-billion total spent on atomic plants from 1943 to the present.

In another way, the huge high-speed program will drastically affect the return to normal civilian construction operations. Superimposed on present mobilization plans, the tremendous expansion job is bound to put a heavy bite on limited supplies of structural shapes, steel plate and copper—to mention only a few basics among the many materials required. Size and duration of the added program will almost certainly prolong the period of construction controls.

• **Drive starts**—Sen. Brien McMahon, chairman of the Joint Committee on Atomic Energy, sparked the current drive for the huge expansion by his September speech urging the military to give due weight to all the new developments in atomic weapons when laying out their long-range plans for defense.

Since then his committee has questioned all the Defense Dept. heads in closed sessions. Without a dissent, the four civilian secretaries (Lovett, Pace, Kimball and Finletter) and their chiefs of staff urged an immediate start.

Before Congress adjourns, the two Houses will almost certainly authorize the $5-to-$6-billion expansion. Money is not needed at once. AEC has enough in the till to finance the planning. Congress can wait until January to appropriate the first construction funds.

• **Speed seen**—Design work and the negotiating of design contracts could be carried through promptly as soon as the authorization is approved. By a fastest time schedule, construction contracts could begin to come out before spring of next year.

Congressional trail-blazers for the needed legislation think the AEC could complete the program in 24 months—certainly in 30. That estimate may be over-optimistic, but some important units of the huge program should be ready for dry runs in 1954.

Big as it is, the expansion plan will have tremendous impact on the construction complex in this country. Pushing hard on its present $2-billion plant construction program, the AEC is currently spending a rate exceeding $1 billion a year. In fact the spending rate for construction alone—as distinguished from installed equipment—comes close to $1 billion a year.

What this rate means in construction materials is indicated roughly by AEC requirements for the current quarter—satisfied 100% by DPA and NPA allotments.

In the fourth quarter, AEC projects are taking more than 180,000 tons of steel—including 35,000 tons of structural shapes—plus more than 7 million lb. copper and 7.5 million aluminum.

• **New program**—Just as this current AEC construction program begins to taper off next year, there will be superimposed on top of it the start of a vastly bigger and faster program. Once it gets rolling, the new program will be consuming construction materials at three times the rate of the present expansion—if the new plants are to be completed at hoped-for speed.

On the basis of current consumption by AEC projects, the accelerated building pace would require more than 500,000 tons of finished steel per quarter, including at least 100,000 tons of structural shapes. Other requirements would run in excess of 20 million lb. per quarter both for copper and for aluminum.

• **Atomic expansion**—The huge atomic building program coming early next year will delay for many months the predicted decline in industrial demand for construction materials. Industrial building for non-atomic purposes is moving now at a pace of more than $200 million a month. This rate is sustained by controlled materials allotments for the current three-month period that include 206,000 tons of structural shapes, 30 million lb. of copper and 5 million lb. of aluminum. Requirements run much higher than allotments.

• **Other allotments deferred**—By the third and fourth quarters of next year, DPA had hoped to increase allotments of controlled materials to essential hospitals, schools, power plants, highways and other essential construction projects.

$42-million dam project planned in Nebraska

LINCOLN, NEB.—Preliminary engineering drawings are now being prepared for a $42-million water-conservation and power project that would store waters of a number of small streams and additional waters of the Platte River in central Nebraska.

Known as the Nebraska Mid-State Reclamation Project, it would provide the state with a fourth major water storage system (added to the existing Platte Valley, Loup River and Tri-County systems that now store nearly 2,000,000 acre-ft of water and are linked to supply the state with electric power).

Consulting engineer for the new project is Adolph F. Meyer of Minneapolis, chief engineer is R. F. Nosky of North Platte, Neb.

Authorized under a 1947 act of the state legislature, the Mid-State project is planned to store 578,000 acre-ft of water for irrigation (much of it supplemental) of 499,000 acres of farmland, and for the manufacture of power.

As proposed, the project would begin with a Platte River diversion dam near Lexington, where water returned to the river from nearby Johnson power plant would be picked up. A string of reservoirs in the sandhills north of the river valley, connected by short canals, would be utilized, the largest storing 120,000 acre-ft both of Platte River water and occasional water from small streams feeding into the river valley. Five small power plants are planned.

Quantities involved if the project is built (and financing is still to be arranged) would include: 12 million cu yd of excavation; 16.9 million cu yd of fill; 89,000 cu yd of reinforced concrete.

Cuyahoga River dredging to speed ore unloading

CLEVELAND—To let iron ore freighters reach Cleveland area steel company docks earlier in the spring than usual, Army Engineers will start this month and next to dredge the channel in the Cuyahoga River five feet deeper.

The plan is to dredge now in order to avoid delays next spring, when deposit of five feet of sediment during winter months usually prevents use of the upper river until it is removed.

Bids for the job of removing and disposing of 200,000 cu yds were opened last week by Col. H. W. Schull, Jr., Buffalo district engineer. Great Lakes Dredge and Dock Co. bid 69.7 cents per cu yd; Merritt, Chapman and Scott Corp. bid 72.4 cents per cu yd.

Construction plans and awards active

NEW YORK—Announcement by Chevrolet Motor Division of General Motors Corp. of a new aviation engine plant was made this week. The new plant will be located on a recently acquired site at Flint, Mich., and is estimated to cost $30 million.

The Flint plant will produce Wright engines for the Navy and Air Force. According to T. H. Keating, Chevrolet general manager, work will begin as soon as construction contracts are completed.

This new plant will be larger than the Buffalo unit already under construction, but both are scheduled for completion in about a year. It will include a main building 900 by 1,120 feet, an office building, cafeteria, and garage.

• **U. S. Navy**—Announced a $25 million guided missile production plant will be built in Bristol, Tenn., by Sperry and Co. Land is now being acquired. Construction will start after preliminary surveys are completed, with material the Navy already has.

Set for completion 15 months after construction starts, the plant will cover 350,000 sq ft and employ 1,500 workers. Sperry has been designated to select construction contracts with approval of the Navy.

• **Pacific Gas and Electric Co.**—Plans to construct a new $80-million steam electric generating station on the San Joaquin River near Pittsburg, Calif., have been announced.

• **Esso Standard Oil Co.**—The marketing and refinery subsidiary of Standard Oil Co. (N. J.), will spend $35 million to enlarge its refinery at Baton Rouge, La. When the program is completed in two years the processing capacity will be raised from 240,000 to 270,000 barrels a day.

• **National Container Corp.**—Announced award to Merritt-Chapman & Scott Corp. a contract for construction of a $22-million paper mill near Valdosta, Ga.

• **Delaware River Joint Toll Bridge Commission**—Awarded a $3.1 million contract for the construction of substructures for three bridges across the Delaware River to Johnson, Drake & Piper. Bethlehem Steel Co. will furnish steel for the three bridges on a negotiated contract for about $3.3 million.

• **Interlake Iron Corp.**—Announced a $14 million addition to its $20 million improvement program. The new money will be used to modernize and enlarge the Cleveland firm's blast furnaces at Erie, Pa. and Chicago and to reline and improve the second Chicago furnace.

• **Kaiser Aluminum and Chemical Co.**—Has asked the National Production Authority for certificates of necessity and material allocations to build $50 million in additions to its Newark, Ohio, plant.

• **Canadian General Electric Co., Ltd.**—Announced purchase of a 140-acre tract about two miles north of Weston, Ont. Plans call for construction of a $12 million plant. Scheduled for completion in 1953, it will employ 1,200 persons in the making of electrical equipment.

Highest dam proposed

Hells Canyon Dam, proposed as the world's highest, was recommended to Congress by Secretary of Interior Oscar I. Chapman early this week, with Presidential backing.

The project would be built on the Snake River in Idaho at a cost of about $405.4 million and would add more than 1,400,000 kw of power to the Columbia River system.

Chapman also recommended authorization of the Scriver Creek power features of the Payette unit of the Mountain Home Division of Snake River Reclamation project at an additional cost of $49.6 million.

San Francisco engineers backed in tunnel report

SAN FRANCISCO—Another noted engineer has sided with San Francisco city officials in their dispute with Morrison-Knudsen Co., contractors for the project. (ENR Sept 12, p. 29)

Karl Terzaghi, Harvard University professor of civil engineering, joined experts Ole Singstad, John P. Buwalda, and Hyde Forbes in support of the city's specifications for the $6 million Broadway twin bore traffic artery through Russian Hill. He made the following suggestions:

• Timber lagging be taken out so that at least 50% of the concrete lining will bear directly on rock. (This suggestion was also made by Singstad.)

• Both north and south bores proceed together so that one tunnel will be excavated full-face about 500 ft ahead of the point to which the other tunnel has been lined. (As work is now projected and under way, the north tunnel is being excavated full-face and lined as the excavation proceeds, while only pilot drifts have been driven on the south tunnel.)

• Make further confirmatory tests on bearing of the rock.

Henry T. Heald

Henry T. Heald becomes chancellor of N. Y. U.

CHICAGO—Henry T. Heald, who in 10 years as president of Illinois Institute of Technology developed a small engineering school into one of the largest technology centers in the world, has accepted the chancellorship of New York University.

The 46-year-old civil engineer, educator and outstanding civic leader, will assume the new office early in 1952. He will succeed Harry Woodburn Chase, who retired last July 1.

"It is with deepest regret that I terminate an association to which I have devoted my energies for 24 years," Dr. Heald said in announcing his decision. "I leave only because the chancellorship of New York University represents an important challenge and opportunity in a broader field of public service."

• **Record**—Dr. Heald received his civil engineering degree in 1923 from the State College of Washington and the master of science degree two years later from the University of Illinois.

After working as a civil engineer on reclamation projects in the West and as a bridge designer, he joined the civil engineering faculty of Armour Institute of Technology in Chicago in 1927. He became dean of the college in 1934 and president four years later. Illinois Tech was established in 1940 through the merger of Armour Institute and Lewis Institute, and Dr. Heald was appointed to be its president.

• **Growth cited**—During his tenure Illinois Tech has had a phenomenal growth and has pioneered in the organization of close relationship between industry and the research laboratories.

AEC official says

Atomic industries to pose problems vital in water works engineering

WASHINGTON—Water works operators should get ready now to serve atomic industries—both those that produce atomic materials and those that use them. So spoke Arthur E. Gorman, sanitary engineer for the Atomic Energy Commission, in an address before the Wisconsin section of the American Water Works Association.

The possibility of radioactive materials flowing through a country-side because of faulty treatment by a water utility is a haunting specter. But even worse would be the destruction of an atomic reactor because a local supply failed in its service to the plant.

Water of special quality—and in assured quantity—is a prerequisite in the production and use of atomic materials.

• **Importance stressed**—For heat exchange in a water-cooled reactor, the supply must meet rigid standards of quality and quantity, especially in regard to certain dissolved salts, low temperatures, high rate of consumption, and extraordinary provisions to assure uninterrupted service.

If the water used for heat exchange contains dissolved salts of an element with a long radioactive half life, its inadvertent discharge into waterways could hurt people and industries downstream. Water containing these salts must be given extremely expensive treatment to make safe for animal and plant life.

In atomic production, the high temperatures involved make it imperative that water have low temperature and a high rate of flow, and, above all, that the flow be constant. Failure of the water supply could be the worst nightmare of a local water system.

• **Use own**—Up to now, AEC production plants have developed their own water systems. Either there were no existing water systems, or else the existing ones were incapable of supplying the needs.

Water is a determining factor in the location of these big production plants. Gorman didn't use it as an example, but the billion dollar Savannah River plant illustrates the point. That plant is going where it is largely because the water available there saves the AEC up to $165 million in the cost of treatment facilities.

• **May explode**—Now with the Defense Department and the armed forces urging Congress to vote billions more for atomic weapons expansion, and with the increasing role of radioactive materials in industrial processes, the problem may explode in the faces of local management long before they expect it. Gorman's talk showed these men what they should be doing to get ready.

Some alert water works men are already busy preparing for the future. In Chicago and Los Angeles the water departments have purchased instruments for measuring radioactivity in water, and are carrying on further research on their own.

Other utilities have assigned staff members to attend special training courses at seminars organized by the AEC, the Public Health Service, and various universities. The newly authorized committee in the AWWA on "instrumentation and methods of testing radioactive contamination of water" is another forward step taken by the water works industry.

• **Sources given**—Individual water works men who wish to learn more about the problems raised by atomic processes can get in touch with the regional headquarters of the AEC. The AEC has already set up advisory committees at Hanford and Schenectady.

Steam plant construction halted by court order

LITTLE ROCK—An Arkansas cooperative has been stopped—at least temporarily—from constructing a $10.5-million steam plant and transmission lines, which private utilities say would duplicate already existing facilities.

The halt was called by the Circuit Court of Pulaski County, which enjoined the Arkansas Electric Cooperative Corp. from proceeding with construction until its permit has been reviewed by the court.

Four private utilities and the International Brotherhood of Electrical Workers, AFL, appealed the order of the Arkansas public service commission issuing a permit to build.

The injunction was reportedly granted on two points:

• That the federal government has no right to build steam plants.

• That no rural electric cooperative has authority to manufacture power for sale except to its customers or to other cooperatives.

Defective boom charged

Use of defective equipment has been charged against a Washington, D. C. contractor, in the death of Myer Grodsky, 38, Sept. 7 when a power crane boom snapped.

Hutchison Crane Excavating Co., Inc. is scheduled to face the charge in Municipal Court next week. It was placed against the company after an investigation by the Minimum Wage and Industrial Safety Board disclosed a faulty boom.

Grodsky, president of a Bethesda, Md. home construction company, was killed while inspecting a home he was building for his own use. He had hired the Hutchison Co. to do the excavating work for him.

Northwest balance sought in power, aluminum output

SEATTLE—Construction of new aluminum plants in the Pacific Northwest will be carefully measured against progress in construction of new power facilities.

This fact emerged as heavy rains relieved a power shortage which cut 12% from the region's aluminum output for two weeks. More curtailments may occur, but J. G. Gumz of the Defense Electric Power Administration, can foresee none through next week unless cold weather comes.

Moves to assure against more cutbacks include:

• An extension of daylight savings time in Washington and Oregon at the request of Defense Mobilizer Charles E. Wilson and Interior Secretary Oscar L. Chapman which will add about 250,000 kw to capacity in the Northwest pool.

• Approval by the House Public Works Committee of federal construction of eight fuel-fired electric generating plants in the Northwest.

• Creation by the Defense Production Administration of a four-member committee to develop and recommend a new national power expansion program "adequate to meet defense needs."

Mr. Wilson told a Governors' Conference last week that there will be no new aluminum plants in the Northwest and said plans to relocate a part of capacity still are under study.

Apparently he excepted Alcoa projected plant at Wenatchee, Wash. which is already under construction. Possibly affected may be expansions by Kaiser Aluminum and Chemical Corp., and Reynolds Metals Co. Plans by Harvey Machine Co. for a $42-million venture at Kalispell, Mont. and Seattle, Wash. appear definitely shelved.

Ohio engineer resigns after highway failure

COLUMBUS, O.—Dawson Smith, chief engineer of Division 11 of the Ohio State Highway Department, has resigned following a 500-ft new highway road failure near Newcomerstown, Ohio (ENR Oct. 4, p. 26). The road crumbled 15 minutes after the new highway was opened.

Mr. Smith's resignation was accepted by State Highway Director T. J. Kauer, who is conducting an investigation of the failure.

Two engineers working under Mr. Smith were given 30-day suspensions and the two contracting companies involved have been barred from bidding on future state projects until the investigation is completed.

• **Road described**—H. W. Holt & Son, of Columbus, was principal contractor on the $201,122 project. The Edgar Spring Co., of New Philadelphia, had the subcontract to lay out 4-inch layers of water-bound macadam and a blacktop driving surface 2½ inches thick. The Holt company did the fill work and laid the gravel sub-base.

Preliminary investigation showed the road failed because the 8-ft deep embankment on which it was built was "not consolidated properly," according to Mr. Kauer. He said there was fire clay in the embankment.

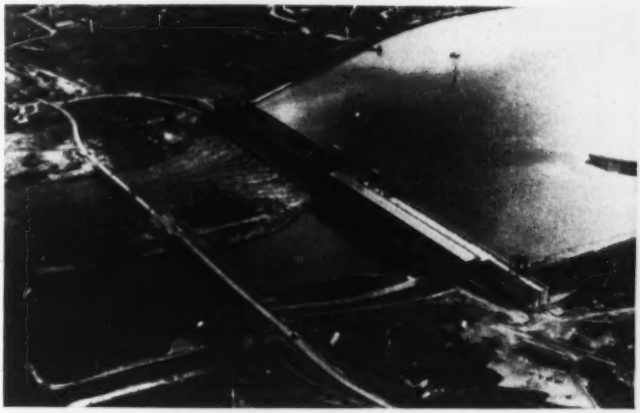
• **Nothing done**—Trucks working on the roadway sank into the fill before the gravel base and macadam were laid but nothing was done to correct this condition, Mr. Kauer stated. All highway contracts state that no money will be paid until faulty sections are corrected.

New extension authorized for Pennsylvania turnpike

HARRISBURGH, PA.—Authorization of a northeastern extension of the Pennsylvania turnpike has been signed by Governor John S. Fine. The new spur will originate from a point east of the Susquehanna River on the existing toll road and continue to the New York state line between the Susquehanna and the Delaware rivers. Between these limits the location of the extension is left up to the Turnpike Commission.

Engineer gets $450,000 turnpike assignment

COLUMBUS, O.—J. E. Greiner Co., of Baltimore, has been hired by the Ohio Turnpike Commission as consulting engineer on the Ohio Turnpike. Employment is on a percentage basis to total an estimated $450,000.



MORE POWER FROM THE ST. LAWRENCE—A new addition to the Beauharnois power plant on the St. Lawrence River in Quebec (right center) will add 660,000 hp to the 758,000 hp being produced in the older plant at the left. Work on a third plant is under way at the right. (Canada Wide Photo)

Beauharnois power plant expanded

MONTREAL, CANADA—The first three of twelve new 55,000-hp generating units in Plant No. 2 of the Beauharnois Light and Power Co. on the St. Lawrence River above Montreal were put into service recently.

When all the new units in Plant No. 2 are in operation, the Beauharnois station will have an installed capacity of 1,418,000 hp.

Work on Plant No. 3, which will bring the total capacity up to 2,188,000 hp, has been started. That will make this great power station second on this continent to Grand Coulee, which has an ultimate capacity of 2,500,000 hp.

• **Private venture**—Begun in 1929 as a private venture, the project now is owned by the Quebec Hydro-Electric Commission. It is located at the lower end of a 15-mile canal connecting two lakes in the St. Lawrence River system, Lake St. Francis and Lake St. Louis, and develops the total drop of 83 ft between those lakes.

The power canal is designed to serve ultimately as a unit in the St. Lawrence Seaway project, provision having been made in the plans for construction of a lock near the powerhouse.

• **Pilot canal**—When the project was started, a pilot canal was dug with drag-line excavators, using the earth to build dikes on the river side. Subsequently, that channel was flooded and hydraulic dredges were brought in to widen the channel sufficiently to supply the first units in the power station.

Progressively since then the dredges have widened and deepened the canal as the power plant expanded until now it is 3,300 ft wide. About 150 million yards of glacial material and rock have been moved in this operation.

When the seaway is built, a width of 600 ft of the canal will be deepened to 27 ft as a ship channel.

Superhighway planned to aid Delaware traffic

DOVER—Plans for a new superhighway to parallel the DuPont Parkway and alleviate the increased traffic created by the new Delaware Memorial bridge near Wilmington were disclosed last week.

The first official confirmation came from William J. Miller, Jr., traffic and planning engineer of the State Highway Department, who said, since the opening of the new bridge traffic on the DuPont Parkway has increased 77.4%.

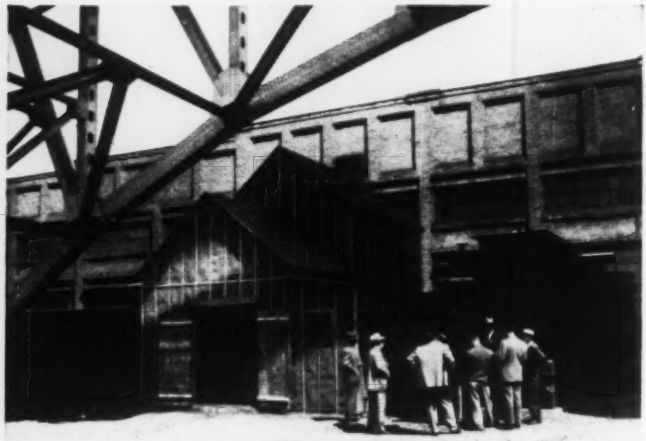
Detroit to get $40-million water system addition

DETROIT—The government began scheduling materials last week for a $40-million expansion of Detroit's water system. Planned as a four-year program, the project will include expansion of plant and pipeline facilities throughout the city.

Action by NPA was based on a city plea of an inadequate water system for Detroit's growing population and 39 outlying communities. The new system will provide enough water for 3,250,000 persons.

Concentrated sludge: The Laboon process

Lab and pilot plant evidence now available has led to a new sludge handling design



IF'S GO DOWN THE DRAIN—It's just a tarpapered shack beneath a railroad track where a sewer empties into the Monongahela. Inside: progress on a new sewage treatment process. Outside, John Laboon tells some visitors about it.

CONCENTRATED SLUDGE—only five days digested but averaging 20% solids—can be pumped, filtered, burned, and maybe even completely digested.

This much is already apparent from laboratory and pilot plant findings of John F. Laboon's Allegheny County Sanitary Authority, Pittsburgh.

ACSA's evidence that concentrated sludge can be handled—gathered over the past year but just released for publication—has led Metcalf & Eddy, consultants to the authority, into design of novel sludge facilities for the authority's $60 million sewerage project.

Authority Chairman Laboon claims his process (patents applied for) will save $4 million on first cost of the primary treatment works, originally proposed with sludge digestion and power generation, and cut fixed charges and operating costs by over $100,000 per year.

• No magic—There's no trick to sludge concentration as performed by Mr. Laboon's research forces. He learned how to get the material into concentrated form by watching some raw sewage sludge digest in a glass.

For the first several days, carbon dioxide produced in digestion of unseeded raw sludge seeks to escape, carrying solids up to the surface with it. Once CO_2 production is completed and the methane gas digestion begins, the mass sinks to the bottom for completion of digestion.

Why wait 30 days or more for digested sludge, figured Mr. Laboon, if you can handle the undigested stuff compacted at the top of the tank after, say, five days? Obviously, the answer to that question lay in its big IF.

The "if" has long since gone down the drain of Laboon's pilot plant along with many gallons of concentrated sludge.

• A process evolves—Laboratory work showed that sludge, settled out of raw Pittsburgh sewage and put in a glass cylinder at 95 deg F would fully separate in five days—virtually all solids being floated on a clear liquid with a temporary buoyancy provided by the escaping gases.

Would it work in a plant-sized tank as it did in the laboratory containers?

To answer this one, Allegheny County Sanitary Authority built and set up shop in a $13,000 pilot plant over a raw combined sewage outfall within the confines of U. S. Steel's Homestead works. It was a peculiarly advantageous spot: wastes there were a fairly representative mixture of domestic and industrial, from the Borough of Homestead's 10,000 population, and in sufficient quantity for a 100,000 gpd operation; the hosts, U. S. Steel, maintain a strict security guard on their premises, affording the authority all the privacy it wanted for its research.

A 24-hour-per-day operation was staffed for seven days a week beginning last October. Sewage was put through a combination aerated grit chamber and aeration tank and a conventional settling tank, from which sludge was drawn. To simulate actual depth and pressure conditions, tanks for sludge concentration tests were made 13 ft high. There are ten of them in all— 24 x 24 in. and hexagonal in plan, fabricated of sheet steel and transparent plastic. A 10-ft high glass cylinder of 6-in. diameter is used to good advantage in observing sludge action, the glass does stay transparent.

It worked fine. In a newly filled tank, preheated sludge began rising within a matter of hours and within a day nearly all solids appeared to be in the top 2 to 3 ft. of the column. So noticeably did solids thicken there that experienced pilot plant operators could stick a trowel into the mass and guess fairly accurately how long it had been concentrating.

After five days at the 95 deg F temperature the stuff was as ready for handling as it would ever be by this particular process. Left there much longer it would begin to sink and lose its high solids content—which does not vary much outside a 16 to 24% range.

They drew off the "subnatant," a clear, usually beer-colored liquid (sometimes black), from the bottom, and there they had it: concentrated sludge in quantity.

• It works anywhere—Next, ACSA put its process on the road. Authority chemists went to Buffalo, Detroit, Minneapolis-St. Paul, Chicago and Cleveland; they took samples of sludge from the various treatment processes employed in these cities

and flew them home to see if they would concentrate.

Findings were encouraging. Raw sludge from other sources separated in five days as well as did Homestead's. Activated sludge concentrated too—but not as well for some reason yet to be determined.

Others tried this method of concentration with success. The Minneapolis-St. Paul Sanitary District queried Laboon: They had concentrated some sludge to 20% solids; what should they do with it next?

• **How to move it**—Five-day concentrated sludge at the top of the tank was a fibrous stuff, dry and cohesive enough to cling together in a gob when troweled—and even stick to an overturned trowel. It had the consistency of damp cohesive soil with fibers added.

Screw conveyors worked in moving this putrescible matter; conventional pumps wouldn't handle it.

An unconventional pump (for sewage works) was hit upon as the solution. It's the Moyno progressing cavity pump—a self-priming, positive displacement device that is claimed able to move a long list of things including: cake icing, cold cream, plaster, potato salad, and glue. (J. L. Moineau's invention, it came here from France and since 1936 has been produced by Robbins & Myers, Springfield, Ohio.)

Within this strikingly simple-looking pump, a helical rotor turns in the double helical interior of a cylindrical stator. During revolution, voids between rotor and stator progress toward one end of the stator (the direction being reversible). Units large enough to pump 250 gpm and against pressures to 600 psi are available.

At its pilot plant, the Sanitary Authority has had a 4-gpm unit circulating concentrated sludge through 195 ft of 4-in. pipe. The line is fitted with pressure gages, for observing flow characteristics, and eight right angle bends, for resistance.

Initial pressure at the pump has been about 64 psi. But a noteworthy thing happens: The concentrated sludge, thick enough to be forked before pumping, is homogenized in the pump and flows through the line as a soupy fluid without tendency to settle or cake on pipe walls.

Recirculated, the homogenized fluid goes through the pump at greatly diminished pressures—down to about 10 psi—but, of course, it would not be recirculated in an actual installation.

• **It filters, too**—Mr. Laboon's concentrated sludge not only can be pumped; it can be filtered—and without costly chemical conditioning. He claims it has not had time in five days to assume the gelatinous colloidal nature of digested sludge. Digested sludge has a negative charge holding particles together and trapping water between; chemicals of plus charge must be added if it is to dewater well on a filter.

Not so with concentrated sludge. In tests made on a small vacuum filter, it formed a ¼-in. thick filter cake (32% solids) with no chemical conditioning at all.

• **And it'll burn**—So far as Allegheny County is concerned, the bugs are all out of concentrated sludge process. They can produce it, they can pump it, and they have in Pittsburgh the cheap coal with which to burn it by multiple-hearth incineration. A whole year's records of percent moisture, pH, and volatiles tell a pretty convincing story.

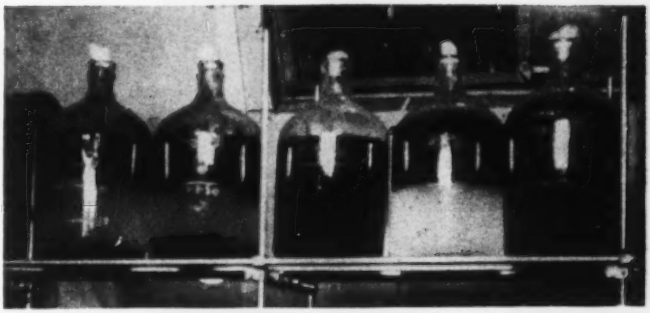
But research goes on. The authority is now set up to find out whether concentrated sludge or partially concentrated sludge will further and fully digest in a tank provided with an agitating mechanism that will ease the escape of later gases of digestion (mostly methane).

Obviously, if concentrated sludge will digest, there are great savings to be made in size or number of digestion units for future plants. Concentrated sludge has only one-third or one-fourth the volume of raw stuff.

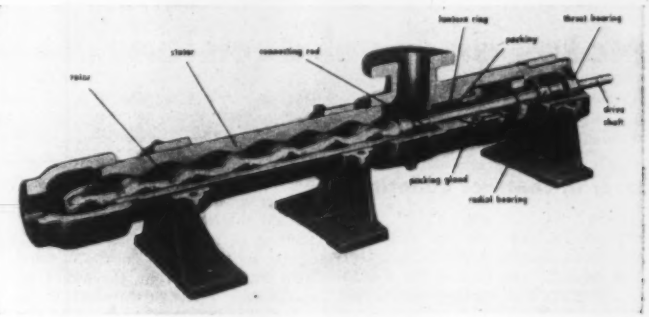
• **Pittsburgh's design**—Metcalf and Eddy, adopting the concentration principle, are now designing what will be the first sewage treatment plant to incorporate it.

Sludge from primary settling tanks will go into a battery of probably eight concentration tanks. These will be rectangular reinforced concrete structures 15 ft deep, 105 ft long, and 45 ft wide. They will be covered, heated, ventilated for odor control and will have a sludge collecting mechanism in their bottoms.

After five days in these tanks at 95 deg. F, the sludge will have its subnatant drawn off; the concentrated remainder will be dragged to



HERE'S THE PRINCIPLE—Reading from left, jar 4 contains 6-day-old sludge. Solids are all concentrated at top above a clear subnatant. Jars 1 and 2 hold 8-day-old sludge which has begun to drop due to completion of CO_2 production. In jars 3 and 5 concentrated sludge floating at top is indistinguishable because subnatant is black.



AND HERE'S THE PUMP that will handle the sludge—sludge so concentrated that normally useful pumps wouldn't move it.

hoppers at one end of the tank, then pumped to storage tanks in the incineration building. Supplemental fuel (coal) will be loaded on screw conveyors, which will feed the incinerator furnaces. Odoriferous gases from the covered concentration tanks will be blown into the furnaces as makeup air.

Details of this general sludge handling plan now are on M & E's drawing board. Design of the rest of Pittsburgh's plant is near completion.

The $12.5 million plant will be situated on the north bank of the Ohio in Pittsburgh opposite the town of McKees Rocks. It will handle 150 mgd, the flow from Pittsburgh and 60 of the 128 other communities in Allegheny County—including no small amount of industrial wastes.

Waste surveys made by the Sanitary Authority for 31 industries in the county have indicated that wastes to be treated will leave a concentratable sludge. Miss H. Gladys Swope, now senior chemist at AEC's Argonne National Laboratory, performed the analyses.

John F. Laboon, as chief engineer and chairman of the Allegheny County Sanitary Authority, has directed all research and development. The idea of concentrated sludge is his. E. E. Bankson formerly was the authority's managing engineer. Stanley M. Dore has taken his place with the title of deputy chief engineer. For Metcalf & Eddy, Frank L. Flood is in charge of the project.

Notes on legal decisions

Summaries of decisions relating to construction work prepared by I. Vernon Werbin, counselor at law and engineer, New York, author of Legal Phases of Construction Contracts (McGraw-Hill Book Co.)

Error in contract quantities

New York State, on Oct. 11, 1948, entered into a contract with the Wholesale Service Supply Co. to furnish 60,000 ft of fencing for a wildlife project. The contract stated that "the quantities listed herein are based on requirements on file in the Division of Standards and Purchase. The contract, however, is for quantities as actually ordered by any state agency during the contract period", which was to expire March 31, 1949.

Upon receipt of the contract document, the contractor placed an order for 60,000 ft of fence with the Pittsburgh Steel Co., as the type required was not standard and had to be specially fabricated. Deliveries were made Oct. 23, 30, Nov. 1 and Dec. 2. On Nov. 17, after a substantial part of the fencing had been delivered, the Wholesale Service Supply Co. requested the state's agent to furnish it with a delivery order. When no order was forthcoming after repeated inquiry, the supply company finally was advised that while the proposal and award called for 600 rolls (60,000 ft of fence) the actual requirement was only about 60 rolls, and that this mistake was why no order had been placed.

The company finally was given an order for 137 rolls, and by its own efforts was able to dispose of 26, leaving 437 rolls, which the manufacturer refused to take back.

As the state refused to issue an order for delivery or pay for these 437 rolls the contractor brought action to recover for the same. The state contended that it was only liable for the fencing for which it had issued delivery orders. The court, however, held that at the time the award was made each party to the contract believed that it was contracting, and intended to contract, for the delivery of a specific quantity of fencing. Under these circumstances, it stated, the contractor was entitled to a recovery.[1]

The court pointed out that while there was an error in computing the amount of fencing needed, the error and failure to detect the same resulted solely from the negligence of the employees of the state. In order to relieve a party from the effects of a unilateral mistake, it is imperative that the innocent party who had no knowledge of the mistake, and no reason to suspect its existence, must not have been prejudiced by any change in position he may have undergone in reliance on the contract.[2] Here, the contractor had no knowledge of the error and he had a right to rely on the fact that the state in preparing a proposal and award would do so carefully and prudently.[3]

Evidence produced at the trial indicated that the Conservation Department discovered the error some time before all the fencing had been delivered to the contractor but did not notify him until the fence all had been delivered. On this the court said: "Where a party desires to rescind a contract upon the ground of mistake or fraud, he must, upon the discovery of the facts at once announce his purpose, and adhere to it. If he be silent . . . he will be held to have waived the objection, and will be conclusively bound by the contract, as if the mistake or fraud had not occurred."[4]

At the trial the state contended that it should not be held liable because the mistake was not made by the purchasing agency but by the procuring agency. The court held that there was no merit in this contention, stating that "In an organization such as a governmental entity in which an operation must be performed by various agencies over which the other contracting party has no control, the entity must be held liable for an intrinsic error which is committed by one agency and carelessly disregarded by another participating agency."[5,6]

(1) Wholesale Service Supply Co. v. State, 103 N.Y.S. 2d 820, New York Court of Claims, April 4, 1951.
(2) Harding v Knapp, 8 N.Y.S. 2d 224; City of New York v Dowd Lumber Co., 140 App. Div. 358, 125 N.Y.S. 394.
(3) Shirai v Blum, 239 N.Y. 172, 181, 146 N.E. 194, 196, 38 A.L.R. 603.
(4) Grynos v Sanders et al., 93 U.S. 55, 23 L.Ed. 798.
(5) Struck Construction Co. v United States, 96 Ct. Cl. 186.
(6) Young Fehlhaber Pile Co. v State, 177 Misc. 204, 30 N.Y.S. 2d 192, affirmed 265 App. Div. 61, 37 N.Y.S. 2d 928. Metzger v Aetna Ins. Co., 227 N.Y. 411, 125 N.E. 814, 816.

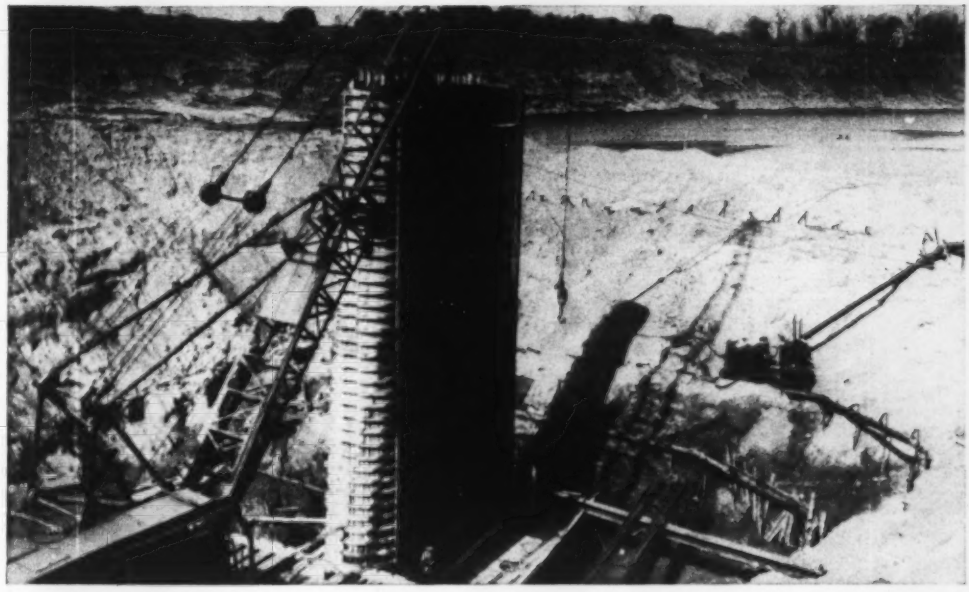
Specific performance of construction contracts

After a real-estate company had sold a piece of land to a client and had built a house on it for him, the purchaser brought action against company to obtain a judgment decreeing that the company remedy all defects in the building and complete it in strict accord with the plans and specifications.[1]

At the trial the buyer proved that the seller had failed to erect the building in close conformity with the plans. But the court refused to grant specific performance of the contract stating in its opinion: "The general rule is now well settled that, on account of the great difficulty and often impossibility attending a judicial superintendence and execution of performance, contracts for the erection or repair of buildings . . ., and the conduct of operations requiring time, special knowledge, skill and personal oversight, will not be specifically enforced."[2]

The court stated further that it would grant the buyer a judgment for the return of the $1,800 deposit paid on the signing of the contract, with interest, and would give him a lien on the property to insure payment.

(1) Stern v Freeport Acres, Inc., N. Y. L. J. April 27, 1951, page 1549.
(2) Quoting from Pomeroy's Specific Performance, 3rd Ed., 1926, p. 61.
Also citing Queen's Plaza Amusement, Inc. v Queens Realty Corp., 36 N.Y.S. 2d 326; Beck et al. v Allison, 56 N.Y. 366.



BRAZOS RIVERBANK was site of this deep bridge pier. Foundation excavation was dried by wellpoints, which were tailored to meet non-uniform soil conditions. (Moretrench photo)

Clay didn't stop wellpoint system

R. A. Seyle
Engineer Assistant
Texas Highway Department
Navasota, Texas

ANY CONTRACTOR can dry his excavation with wellpoints when he's working in sand alone, but it's a different story if there are impervious zones in the sand.

Just such a troublesome condition existed on a Texas Highway Department job recently, and it called for some expert wellpoint tailoring to intercept groundwater both above and below the uncooperative strata.

The job involved deep excavation for one pier of a new bridge across the Brazos River, three miles southwest of Navasota. Standing 88 ft high, the pier has a pile-supported base at El. 115, 35 ft below groundwater level (El. 150). Pier location is on the east bank of the Brazos, where natural ground elevation is 7 ft above the water table.

The alluvial deposits in this pier's area range all the way from coarse granular materials to clay. A silt zone, at El. 131 and a clay zone lying roughly between El. 125 and 120, caused the trouble.

Contractor on the job was F. M. Reeves and Sons, Austin. For this pier, Reeves selected open excavation in preference to a sheetpile cofferdam, engaging the Moretrench Corp. of Houston to keep the hole dry while a dragline dug the dirt.

• **First stage**—The excavation was dewatered in three stages, the first consisting of 500 ft of 8 in. header placed one foot above groundwater, at El 151. Wellpoints, 26 ft long, with 42-in. screens on the bottoms, were jetted to place at 4-ft centers. Two 8-in. vacuum pumps with a capacity of 2000 gpm each were tied into the header and pumping began.

The water level in the downstream half of the excavation was drawn down 10 ft after two days of pumping, but serious leaks developed in the upstream half 4 ft down in the excavation. This leakage apparently was caused by lateral flow through coarse sand along the relatively impervious stratum of silt about 6 ft above the wellpoint screen.

The leakage was overcome by jetting the impervious stratum, and by changing wellpoint length to 20 ft, to intercept the lateral flow.

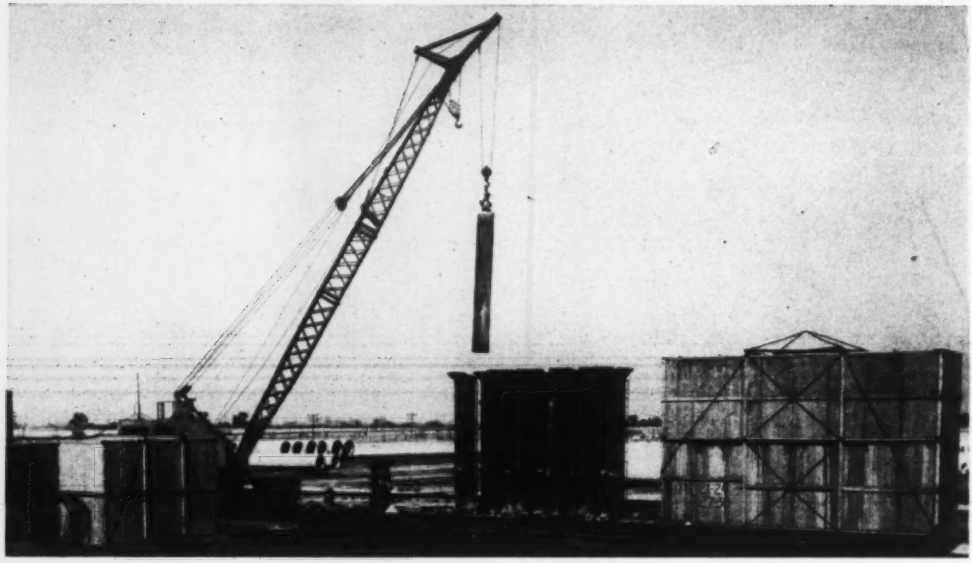
The first stage pumps then pulled the water table in the excavation area down 16 ft, to El 135.

• **Clay shows up**—Twenty-foot wellpoints were installed for the second stage. No progress was made and test excavations disclosed the stratum of clay, which was several feet thick, with its top about ten feet below the second-stage header. Wellpoints in the first header were raised four feet to get in effective position above the clay, as the points in the second header penetrated through it. This operation enabled the contractor to excavate about five feet from the second header to El 130, at which elevation a third stage was installed with ten-foot wellpoints to dewater down to the clay stratum.

Thus the second stage was intended to remove water from under the silt; the third stage would dry the zone between clay and silt and the first stage would take care of pervious strata above silt.

Severe leakage developed from El 125 down to 115, with sand and water flowing in from three sides of the excavation. Six 24-ft wellpoints were put in the first stage at that point, to bring the leak under control. (By now the rest of the first stage points were 16 ft long).

John E. Blair is the Texas Highway Department's District Engineer for Dist. 17 in which the project is located. L. A. Peterman, Senior Resident Engineer of the Texas Highway Department was the project engineer. E. E. Joines was superintendent for the contractor; A. J. Salley and Earl Kirsch represented Moretrench.



POURED CONCRETE PIPE up to 24 ft long for Central Valley project distribution systems are made at the Tulare, Calif., plant of the United Concrete Pipe Corp. Huge plywood boxes cover pipe during steam cure. (USBR photo)

New concrete pipe techniques developed for Central Valley distribution works

IMPROVED CONCRETE PIPE manufacturing techniques and new joint designs have been developed for the irrigation distribution systems that will deliver Central Valley project water.

With first full operation of the initial features of the Herculean California development early in August (ENR Aug. 2, p 28), Bureau of Reclamation construction emphasis has shifted to these distribution facilities. Underway for the past 2 years, this distribution work has now reached a peak with $8,821,300 of contracts let. Additional work is in the design stage and negotiations are under way for still more distribution systems.

Most important new pipe making technique is centrifugal spinning of belled-end concrete pipe. This is accomplished by use of low slump concrete, special form vibration, and close control of spinning speed.

Of significance from a design standpoint are joints specially adapted for the pressures involved (up to 125 ft of static water head but mostly 25 and 50 ft). These joints use rubber gaskets bearing on concrete rather than on steel rings as is necessary for pipe handling higher pressures.

• **Supplements pumped supply**—The major irrigation benefits developed by the Central Valley project accrue to the central and southern part of the San Joaquin Valley. Water is carried by the 1,000-cfs Madera canal and the 4,000-cfs Friant-Kern canal north and south, respectively, from Friant Dam. This area includes some of the richest agricultural land in the United States from the standpoint of farm income.

Much of the water now irrigating these lands is pumped from underground aquifers. Heavy pumping over the years has gradually lowered the water table with pumping costs becoming increasingly higher. Even so, farmers are able to make a substantial profit, and could in most instances continue to do so for some time.

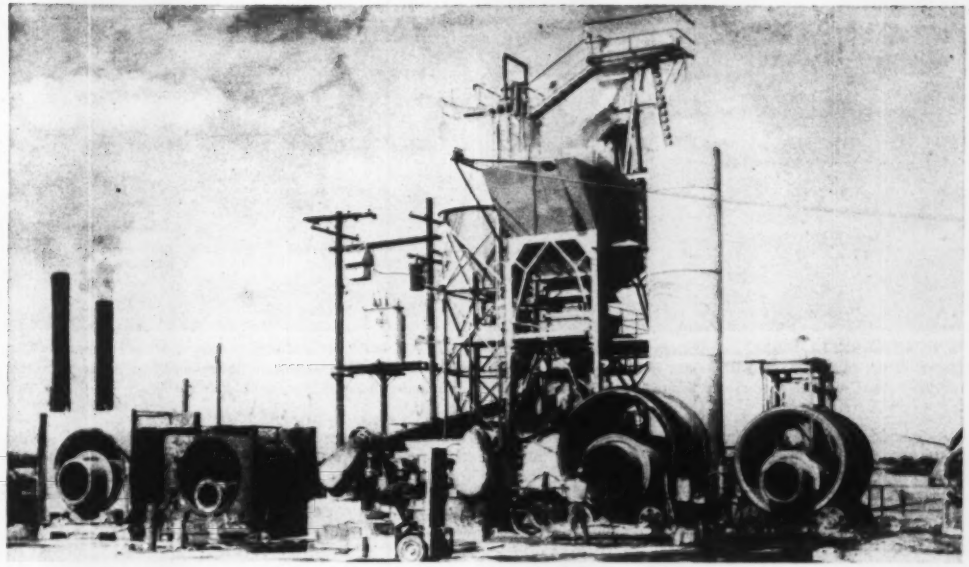
THE COVER

Experimentation with pipemaking techniques continues even after many months of operation. In the cover photo, Concrete Conduit Co. has pipes on end (right) and lying on side at a slight slope (left), to learn which position is better for initial curing.

Central Valley project water, however, is much cheaper, being delivered at the Friant-Kern canal for $3.50 per acre-ft for Class I or firm water and $1.50 per acre-ft for Class II water (i.e., what's left over after Class I users are supplied). Even with the cost of distribution systems added, farmers are finding Central Valley project water much more economical than pumped water.

• **Systems serve districts**—This rich area is divided into irrigation districts organized under the laws of the state of California. Some of these districts have been in operation for 40 and 50 years and others have been newly formed to receive Central Valley project water.

The individual districts have negotiated contracts with the federal government as represented by the U. S. Bureau of Reclamation for design and construction of the systems. This is not required, however, and a few districts are contracting for water only—building their own new systems or using their old ones. However, by having the work done by the Bureau of Reclamation, advantage can be taken



CENTRIFUGALLY SPUN CONCRETE PIPE was made in large sizes and quantities at this Concrete Conduit Co. plant at Lindsay, Calif. This firm developed a pipe joint requiring a separate centrifugally-spun double-rubber-gasket collar. (ENR)

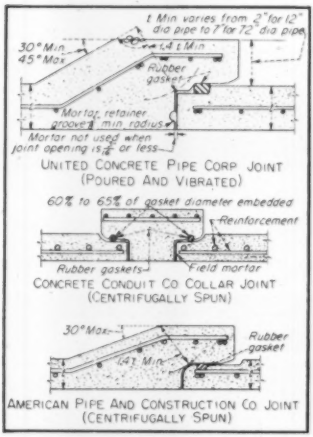
of provisions contained in reclamation law that allows the cost to be repaid over 40 years without interest.

The accompanying table lists the various construction contracts awarded up to the time this article was written.

• **Concrete pipe systems**—Distribution works required for these various districts vary greatly depending upon the size of the district, terrain covered, type of crop generally raised, and many other factors. However, with the exception of the Lindsay-Strathmore District (where extensions of an existing steel pipe distribution system are being made) all systems designed to date have been concrete pipe systems.

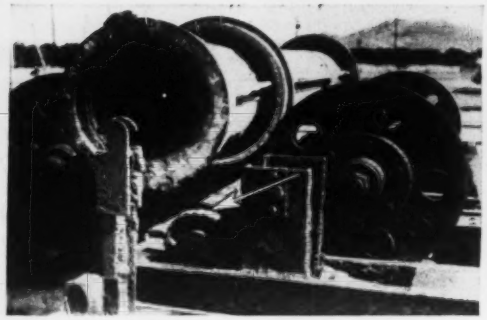
Each system is tailored to the district for which it is designed. For example, farm sizes vary from district to district, ranging from small ones of 10 to 20 acres of oranges to larger units of 160-acre farms for cotton growing. This means that the water service patterns differ widely. Also considered are water requirements for the various crops, the pattern of the crops, water demand in various seasons and the amount of water required to supplement the existing supply. Design in some cases even included a study of the hydraulics of individual farms.

Basic elements of the systems are the concrete pipe laterals, sub-laterals,

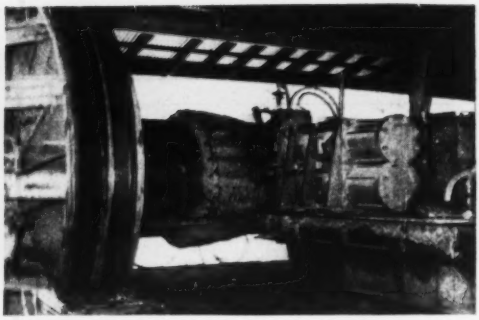


DESIGN DEVELOPMENT calls for joints with rubber gaskets bearing against concrete, not steel. These are examples.

COMBINATION PUMP PLANT and moss screen is typical of major structures required on irrigation distribution systems. These units are built adjacent to the Friant-Kern Canal, being necessary to boost pressure and clean water. (ENR)



SPINNING BELLED END on concrete pipe is new development. Trick is to get mix into forms. Notched roller (arrow) pushes against form and vibrates concrete into bell. (ENR)



BELLED END of reinforcing cages at United Concrete Corp. plant is wrapped at same time as remainder of the cage. Notches on mandrel make this possible. (ENR)

sub-laterals and so on to the individual farm service. However, there is a high number of specialty items in each contract.

On one recent contract (Exeter Irrigation District, Unit No. 1) there were 289 different bid items, ranging all the way from one pump plant float switch to 8,300 lin ft of 50-psi, 12-in. dia concrete pipe in place. Pipe sizes in the Exeter case vary from 12 in. up to 33 in. but in some of the other installations are as large as 72 in.

Cost of the systems has been in the neighborhood of $175 to $200 per acre before the recent rise in construction costs. For much farm land, this would be considered high. But, it can be easily sustained in the rich San Joaquin Valley area. Here, USBR officials say, annual repayment installments for distribution system costs is by no means the controlling factor in a profitable agricultural operation.

• No low pressure precedents—When they came to the actual point of designing the pipelines, Bureau of Reclamation engineers were faced with a strange situation. There was no great background of experience available in in large-scale pressure concrete pipework for relatively low head.

Farm-style irrigation pipe has historically been built for little or no pressure. It usually involves plain mortared tongue-and-groove joints. A large amount of this type pipe is included in these jobs where size is less than 18-in. dia and pressure head no greater than 20 ft.

Joints for concrete pressure pipe have usually included steel rings and rubber gaskets. These are satisfactory for aqueducts and municipal water service but are too expensive for large-scale installation in irrigation distribution works.

It was desired to have a thoroughly adequate system that could be installed at as low a cost as is consistent with that aim. For that reason, pipe-joint specifications for the early contracts were written around tongue-and-groove mortar joints. Pipe manufacturers were encouraged to submit designs for rubber gasketed joints in the larger sizes. Several of these have now been incorporated in distribution system specifications.

Three distinct types of joints were developed for this low pressure type work, each of which employs basically the same principle. That is a rubber gasket making contact with concrete in each joint face. These joints eliminate the need for steel rings and, thus, save cost.

These joints are proving quite satisfactory for this type irrigation work. They probably would not be satisfactory for a utility type service where individual users can turn water on and off at will. Irrigation district operation differs in that services are turned on and off by representatives of the district. In this way, the system is operated so as to eliminate possibility of damaging surges or water hammer.

Each of the three primary pipe makers also developed manufacturing systems to accommodate the new type joint. Since they are all different, each will be described separately below.

• United Concrete Pipe Corp.—This firm adopted a bell and spigot type joint. The rubber gasket is threaded onto the spigot end just before the pipe sections are pulled together. It bears against a shoulder on the spigot and against a shoulder on the bell end. Basic elements of this joint are not new; it is patterned after an old English joint known as the Cornelius-Stanton design.

United makes pipe by pouring them on end in forms and using high frequency vibration. The only new manufacturing technique is that the bell end of the reinforcing cages is continuously wound with the cage for the cylindrical part of the pipe. Previously, these end cages were made separately and welded to the rest of the cage.

USBR specifications allow elliptical reinforcing for pipe 33-in. dia and larger. For these sizes, the manufacturers have their choice of using one elliptical cage or two circular cages, one near the outside face and one near the inside face of the pipe. The ellipse is so arranged that the reinforcing is near the inside pipe surface at the top and bottom and near the outside surface at the sides. By such arrangement, the reinforcing resists the stresses due to backfill loading.

United's plant at Tulare, Calif., is set up to make 70 vibrocast pipe lengths a day in nine sizes 24-in. dia and larger. These are made in varying lengths depending on size. USBR limits are 24 ft for 39-in. dia pipe and larger, 20 ft for 30- to 36-in. dia pipe and 18 ft for 24- and 27-in. dia pipe.

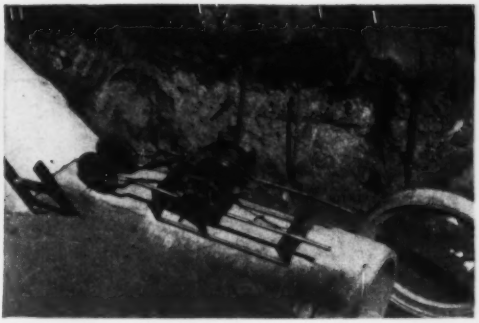
The tongue-and-groove pipe from 12- to 21-in. dia are ram cast by United with light reinforcing for the 18- and 21-in. dia sizes.

• American Pipe & Construction Co.—To date this firm's activity has been confined largely to manufacture under a subcontract of pressure pipe 12- to 27-in. dia. However, on that work the most significant developments in pipe manufacturing techniques have been made. American's joint is similar to the United joint except that the rubber gasket fits into a groove in the spigot end.

All of its rubber-gasket joint pipe has been centrifugally spun, including the belled ends. This is believed to be the first time that bells have been successfully spun on centrifugal pipe.

A primary essential in accomplishing this, according to American officials, is to use a concrete with an ex-

SEATING THE PIPE is done by hand-winch-powered device that pulls against chain chokers. In larger sizes, men may work inside pipe during seating. (ENR)



RATCHET WINCH used by Concrete Conduit Co. to pull smaller size pipe home in making joints. Collar for collar type joints is seen at right. (ENR)

tremely low slump (from ¾ to 1 in.). Concrete is worked in the belled form by a vibrating device consisting of a notched wheel. The wheel is held against the form as it is rotated at 200 rpm. This speed is maintained while the concrete is being placed and while the knockers (vibrating device) are operating. After that the pipe is spun at a 350-rpm speed for drying out the concrete.

American officials are convinced that speed control is most important in spun pipe. For that reason, they have installed motor generator sets that convert alternating to direct current since the latter affords more positive and responsive control. Further, an automatic speed recording device has been installed, and speed checks are made from time to time—particularly when troubles develop.

American also has an automatic feeding device where the operator has direct control over the concrete as it goes into the form. In making the reinforcing cages, American feeds two wires at a time rather than just one. This, it figures, reduces the time for making a cage by 3 min.

• **Concrete Conduit Co.**—The joint employed by this firm is a collar type with rubber gaskets embedded in each side of the collar. After a pipe section is laid, the collar is slipped over the end and then the next pipe section slipped into the other side of the collar. Concrete Conduit Co. has set up a plant at Lindsay but fabricates the collars at its main plant in Colton, Calif., some 200 miles away. This type of joint minimizes manufacturing uncertainties and simplifies field construction work.

The three joints mentioned have been adopted for all ordinary pipework on the distribution systems except for 25-ft head service where size is 21-in. dia and less. There are, of course, many special cases where lines extend under roads and railroads or where for some reason a more positive joint is desired. In such case, a steel ring type joint is specified.

Lines less than 24-in. dia carrying less than 25 ft of head are made with a tongue-and-groove type joint—standard in irrigation work for many years. However, the Bureau of Reclamation has found it advisable (after bad experience on one South San Joaquin Municipal Utility District contract) to install expansion joints on this type pipe at least every 300 ft to minimize splitting of pipelines due to compressive stresses.

• **Credits**—J. W. Rodner is manager for the USBR's San Joaquin Valley District. Field design of the distribution systems is under the direction of Ernest C. Fortier, and field administration construction contracts are directed by R. K. Durant.

Clyde Grant was in charge of the American Pipe & Construction Co. work and supervised development of the improved techniques at its plant. Chris Adzuvich is in charge of the Tulare plant for the United Concrete Pipe Corp. W. W. Hughes is in charge of all Concrete Conduit Co. operations.

CONSTRUCTION CONTRACTS AWARDED FOR FRIANT-KERN CANAL DISTRIBUTION SYSTEM

District	Contractor	Contract Amount	Contract Completion Date	Percent Complete July 1, 1951
Southern San Joaquin Municipal Utility District, Unit 1	United Concrete Pipe Corp	$ 846,670	1-31-51	99
SSJMUD, Unit 2	United Concrete Pipe Corp	1,572,639	10-12-51	34
SSJMUD, Unit 3	United Concrete Pipe Corp	1,671,178	5-24-52	0
Lindmore Irrigation District, Unit 1	Concrete Conduit Co	263,917	9-5-50	100
Lindmore Irrigation District, Unit 2	Concrete Conduit Co	969,662	9-22-51	44
Lindmore Irrigation District, Unit 3	Steve P. Rados, Subcontracted to United Concrete Pipe Corp	666,187	6-20-52	27
Lindsay-Strathmore Irrigation District Trauger Pumping Plant	Stolte Inc. and Fred J. Early, Jr., Co., Inc	709,603	8-8-52	0
Lindsay-Strathmore Irrigation District	R. A. Wattson Co	624,228	6-24-52	0
Ivanhoe Irrigation District	United Concrete Pipe Corp	636,277	7-23-52	0
Exeter Irrigation District, Unit 1	American Pipe & Construction Co	860,941	6-18-52	0
	Total	$8,821,300		

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Bars #9, #10 and #11 are equal in weight and nominal area to the old type 1 in., 1⅛ in., and 1¼ in. square bars, respectively. With the exception of the #2 bar, which is plain round, all other sizes of the Bethlehem Bar are deformed. On each deformed bar the identifying number is branded at regular intervals to become an integral part of the deformation.

All sizes of the Bethlehem Bar are rolled as round sections. No change has been made in the standard unit weights or nominal cross-sectional areas. Therefore there is no need to change design practices, as far as they concern bar section.

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OLD SIZE	¼ in. square (bar with rounded corners)	⅜ in. square (bar with rounded corners)	½ in. square (bar with rounded corners)	⅝ in. square (bar with rounded corners)	¾ in. square (bar with rounded corners)	⅞ in. square (bar with rounded corners)	1 in. square (bar with rounded corners)	1 in. square (bar with rounded corners)	1¼ in. square (bar with rounded corners)	1⅜ in. square (bar with rounded corners)
Nominal Area (Sq. In.)	.05	.11	.20	.31	.44	.60	.79	1.00	1.27	1.56
Nominal Round Diam.	.250	.375	.500	.625	.750	.875	1.000	1.128	1.270	1.410

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Handy Descriptive Sheet

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BETHLEHEM REINFORCING BARS

Big cellular cofferdam and a deep sheetpile cutoff were needed at Minneapolis, in . . .

Solving a tricky dewatering problem

BIG CELLULAR COFFERDAMS are expensive enough even when they work; but when they fail to keep the water out of an excavation area—trouble lies ahead. This the contractors discovered during stage-one construction of the lower lock and dam just below St. Anthony Falls in the Mississippi River at Minneapolis, Minn. (ENR Sept 13, p 37).

At the start of the work in July of last year it looked as though this would be just another routine cofferdam job. A cofferdam was built out from the left (north) bank of the river, to enclose the north 100 ft of dam and a 230-ft non-overflow section that will angle upstream from Pier No. 1.

This cofferdam was made up of steel sheetpile cells in the river arm, which is exposed to the river current. Upstream and downstream arms of the cofferdam—tying the ends of the river arm into the river bank—are earth fills, 160 ft and 200 ft long, respectively.

There are seventeen 28 ft dia cells in the river arm, made up of 16-in. section MP-112 sheetpiles, driven about 2 ft into the sandstone in a previously excavated trench. They are filled with overburden from the trench, plus some borrow material.

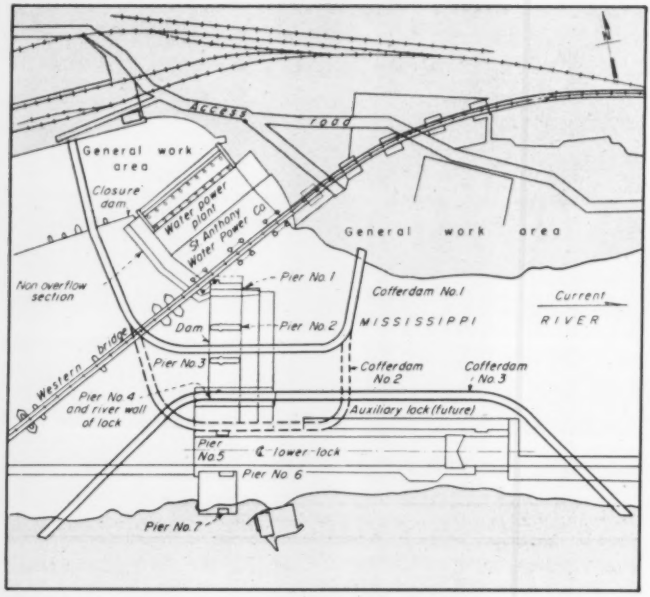
Fifty-two carloads of derrick stone were dumped along the outside of the river arm of the cofferdam, and heavy rock fill was placed on the outside of the upstream earthfill arm. The derrick stone will be used later in the permanent construction downstream from the apron of the dam.

• **Trouble shows up**—The cofferdam was well built and would have done its job under ordinary conditions. But when it was completed, two 12-in. 3,750-gpm electric pumps were unable to dewater it. Investigations disclosed that the inflow was coming through seams in the sandstone beneath the lower ends of the cofferdam cells.

To correct this unlooked-for trouble, and to insure excavating in the dry, the contractors decided the only thing to do was to drive a full-circle of steel sheetpile cutoff wall inside the original cofferdam. This cutoff wall was driven right through the sandstone to El 676, which is 11 ft below the deepest excavation. (In the accompanying photograph of the cofferdam the portion of the cutoff wall along the inside of the cellular river arm was buried beneath a temporary haul road.)

This plan paid off in keeping the water out. When excavation reached El 702 (plan elevation for the bottom of the dam proper), one of the pumps easily kept the hole dry, with only intermittent pumping.

The sandstone is a relatively soft and friable material consisting of 98% quartz sand having practically no cementing material. It can be excavated by dipper dredge in the damsite



STAGE ONE construction for lower lock and dam at Minneapolis is protected from Mississippi River water by cofferdam No. 1, at top on map.

THE LOCAL SANDSTONE makes a good dam foundation in its natural state, but crumbles into a snow-white sand when disturbed. Its lack of cementing qualities made cofferdam construction difficult.

area and in the river downstream without drilling or blasting. In its natural state it makes a good foundation material but pulverizes easily when disturbed, turning into a fine sandy material.

• **What caused the trouble**—The sandstone was found to contain relatively thin seams, and that's what caused the trouble. As the water was lowered inside the cofferdam, creating a hydrostatic pressure on these poorly cemented seams, they gave way—first with a trickle, followed almost instantly by a gush of water that prevented dewatering.

One thing that convinced the contractors that the entire area should be ringed with the sheetpile cutoff was that in addition to the seepage water coming in through the sandstone beneath the cells, "boils" developed in the excavation for Pier No. 1. These occurred when they still had 6 ft more to go to get to grade elevation for the bottom of the dam proper; and 21 ft more to the bottom of a concrete shear and cutoff key to be placed beneath the toe of dam.

The boils were stopped, however, by driving the piling to El 676, which is 26 ft below the bottom of the dam and 11 ft below the bottom of the key.

Average top elevation of the sheetpile is 730, requiring 54-ft piling. A total of 2,000 tons of steel sheetpiles will be required on the entire job; from one-half to two-thirds of which will be recovered. All piling for the job was purchased new.

• **Stone cut with water jet**—One thing in favor of the contractors was that the sandstone cut easily with a water jet. A 2-in. jet operating under 300-psi pressure worked right along with the pile driver.

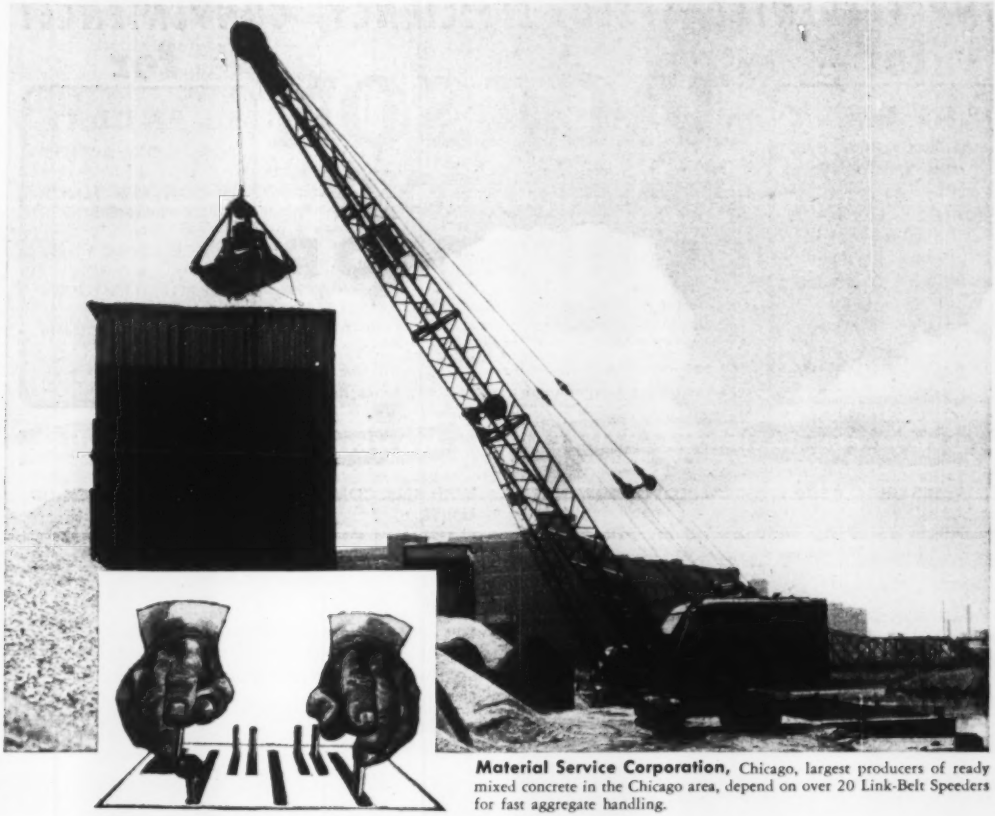
Driving of the sheetpiles however, was not too easy, according to the contractor. Two 16-in. sections of piles were driven at a time, using either a 9B3 or a No. 7 hammer. Piles, jet and hammers were handled by a 90-ft boom crawler crane.

All sheetpiles in the cutoff wall were driven in slots cut by the water jets. Those piles located in the area to be occupied by the dam—all of which extend below the bottom of the dam and shear key—will be extracted.

The sandstone faces, disturbed by the jetting and pile-driving and exposed in the excavation for the lower lock and dam will be chemically solidified. Some of this work is underway.

• **Chemical solidification** – The purpose of the chemical solidification of

(*Continued on page 43*)



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PROPELS ITSELF AS FAST AS 25 FT. PER MINUTE.
The operator merely guides it.

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FIRMLY COMPACTS 15 TO 20 SQ. FT. PER MINUTE.
900 to 1200 sq. ft. per hr.

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IN ASPHALT, CLOSELY APPROACHES THEORETICAL DENSITY OF MATERIAL USED.

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IN PREPARATION OF WATER-BOUND MACADAM BASES it is easily the best means of securing maximum compaction of the stone in lifts of 10" where stone is well graded and does not exceed 4" in size.

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where frequent changes of location are required as in paving, patching operations, there is nothing that approaches the time-saving and convenience features of this complete unit. The VIBRATORY COMPACTOR walks itself right into the hydraulic lift. Folding-leverage action of front wheel standard makes attachment to, or detachment from ordinary auto hitch an easy one man job.

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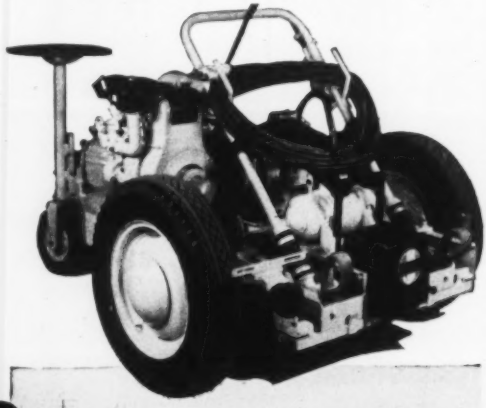


JACKSON VIBRATORS INC.
LUDINGTON MICHIGAN

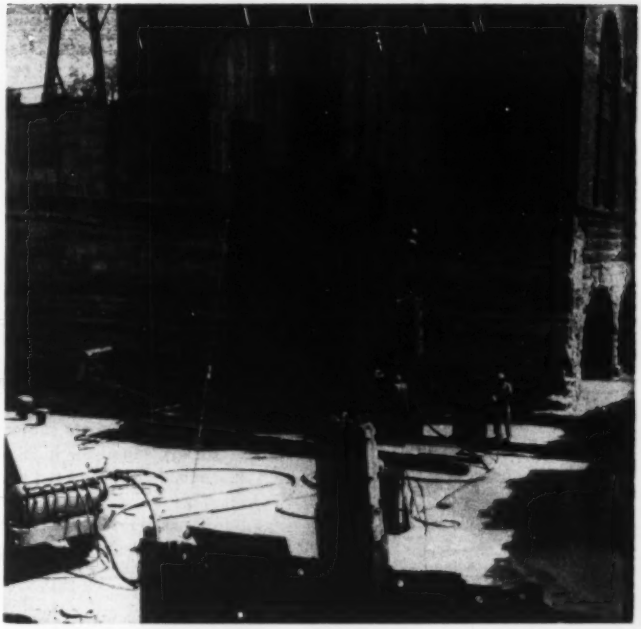
Tricky dewatering problem

(*Continued from page 40*)

the disturbed sandstone is to produce an artificial sandstone of good density. In this operation, a hollow 1¼-in. drill rod, with flush-type joints, in 10 ft lengths, is water-jetted vertically through the disturbed sandstone to the required depth into the undisturbed sandstone zone. Through this 1¼-in. drill rod a Chemical No. I, consisting of modified silicate of soda, is injected under pressure by a double acting duplex pump, air driven, with pressures up to 200 psi, through a specially designed nozzle in sufficient quantity to fill all voids.

The drill rod is then washed with water under pressure prior to injection of another chemical. Chemical No. II, consisting of calcium chloride brine, is then injected into the area under pressure similar to Chemical No. I. Upon completion of this procedure the pipe is raised about 1-ft by use of a crane or jacks and the procedure is repeated and continued until the entire area surrounding the pipe is injected with chemicals. The combination of these two chemicals and the sand produced a new compound of artificial sandstone of good density.

Calcium chloride is shipped to the site in 100-lb bags. Sodium silicate is received in tank cars and placed in storage tanks at the site. Individual pumps and hose lines are used for each chemical and water. Flow is controlled through three valves in lines to injection pipe. The amount of chemicals is controlled by the pump operator by drawdown of calibrated mixing tanks. The Chemical Soils Solidification Co., Chicago, is doing this.



STEEL SHEETPILES WERE DRIVEN 30 to 40 ft into sandstone to seal the cofferdammed area: A 2-in. water jet cut the stone; a heavy hammer drove two 16-in. pile sections at one time.

• **Flooded out last spring**—Having to correct a non-functioning cellular cofferdam wasn't the only headache of the contractors. Flood waters of the Mississippi rose so high at Minneapolis last spring that it was necessary to flood the cofferdam, shutting down the work for 1½ months.

This possibility, however, was foreseen by both the Corps of Engineers and the contractors and a clause was put in the contract permitting the contractor to flood the cofferdam if the river level reached El 734 at the lower arm, at which time there would be only a 2-ft freeboard along this arm.

The contract stipulated that if it became necessary to flood the cofferdam, the contractors were to receive an additional $5,000 to help reimburse them for delay and damages. The cofferdam was dewatered June 1 following completion of the sheetpile cutoff.

• **On schedule by February** — The spring flood, plus the extra time required to drive the steel sheetpile cutoff has put the job considerably behind schedule. Barring any other unforeseen major delays, however, the contractors plan to be back on schedule at least by next Feb. 15.

To do this they are throwing all the equipment and manpower into the job that can be operated efficiently. The total manpower will be built up soon to 150 and provisions are being made to concrete right through the winter, except in extreme sub-zero weather.

• **Not much room to work**—Another handicap to the contractors is the unusually restricted area for their construction plant site. Nestled into the side of a bluff on the north side of the river, it provides barely enough room for a concrete batching and mixing plant; a 100x40-ft machine and repair shop; a 40x30-ft carpenter shop; limited storage for aggregates; and field offices of the contractors and the Corps of Engineers.

The 75-ft high concrete batching and mixing plant—with a rated capacity of 100 cu yd of concrete per hour —is fed by a 30-in. belt conveyor 300-ft long supported on a 16% grade by all-welded pipe bents.

Aggregates and bulk cement will be shipped in by rail and trucked to the batching and concrete mixing plant, which is equipped with completely automatic weighing devices and two 2-cu yd tilting mixers.

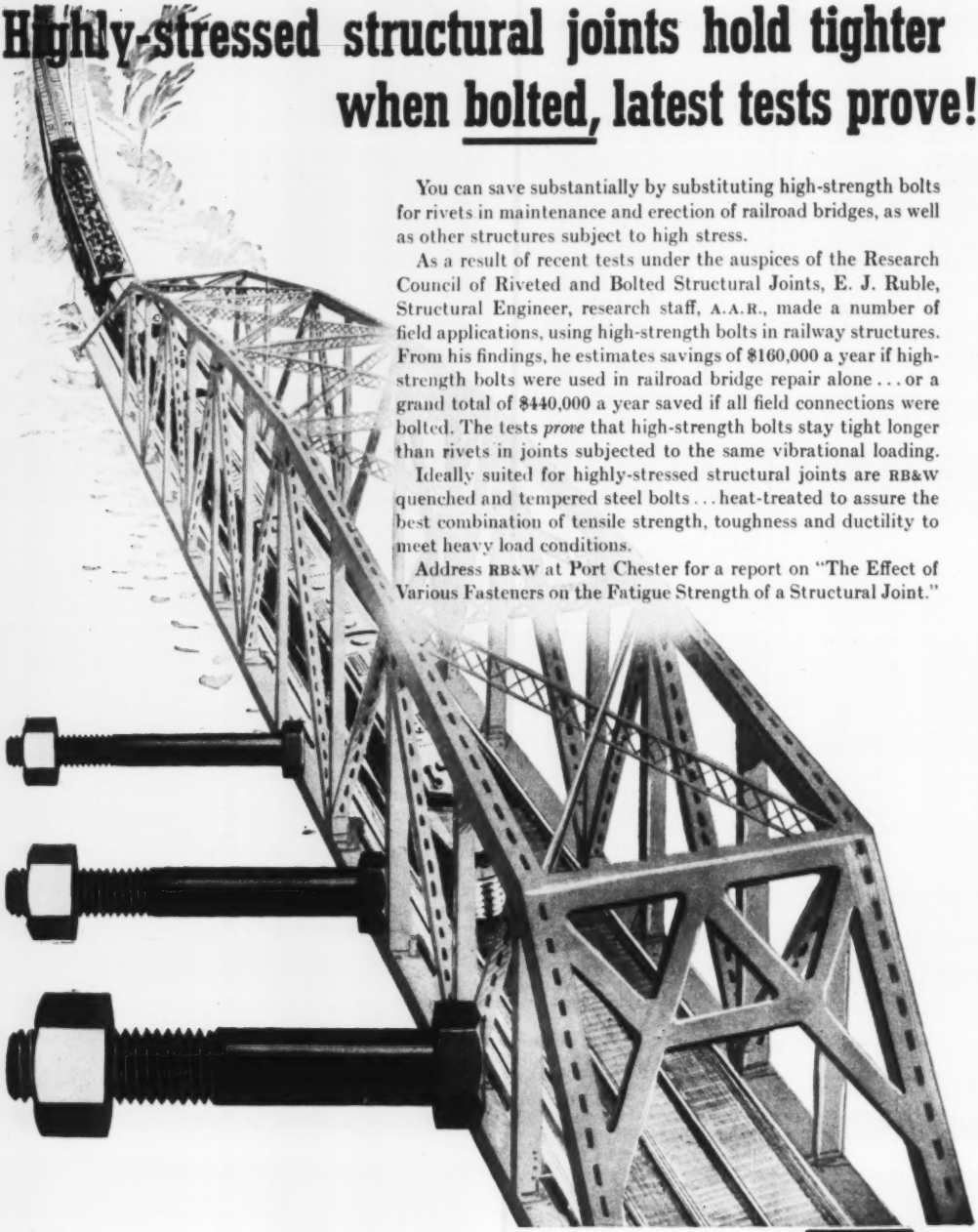
Concrete for the dam will be trucked in 2-cu yd, bottom-dump, air-actuated buckets and placed in the forms by crawler cranes operating on the bed of the river inside of the cofferdams.

Timber panel forms will be used exclusively; the largest ones being 10 ft high by 36 ft long. They are made up of 2-in. tongue-and-groove planking on 3x6-in. studs, using 4x6-in. wales.

• **Joint-venture contract** — Johnson-Kiewit are building the lower lock and dam under a $5,500,000 contract. This is a joint venture of the Al Johnson Constr. Co., Minneapolis, and Peter Kiewit Sons' Co., Omaha. H. L. Mundy, Jr., is project engineer for the contractors and J. H. King, construction superintendent.

Col. L. G. Yoder, district engineer, St. Paul District, Corps of Engineers, has the over-all supervision of the project. H. M. Anderly is chief technical assistant; E. J. Christenson, chief of the construction division; Emil Silverman, project engineer; and C. W. Buending, resident engineer.

Highly-stressed structural joints hold tighter when bolted, latest tests prove!



You can save substantially by substituting high-strength bolts for rivets in maintenance and erection of railroad bridges, as well as other structures subject to high stress.

As a result of recent tests under the auspices of the Research Council of Riveted and Bolted Structural Joints, E. J. Ruble, Structural Engineer, research staff, A.A.R., made a number of field applications, using high-strength bolts in railway structures. From his findings, he estimates savings of $160,000 a year if high-strength bolts were used in railroad bridge repair alone . . . or a grand total of $440,000 a year saved if all field connections were bolted. The tests *prove* that high-strength bolts stay tight longer than rivets in joints subjected to the same vibrational loading.

Ideally suited for highly-stressed structural joints are RB&W quenched and tempered steel bolts . . . heat-treated to assure the best combination of tensile strength, toughness and ductility to meet heavy load conditions.

Address RB&W at Port Chester for a report on "The Effect of Various Fasteners on the Fatigue Strength of a Structural Joint."

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106 YEARS MAKING STRONG THE THINGS THAT MAKE AMERICA STRONG

LONESOME SUBWAY—Since 1933 this section of Philadelphia's Market street subway extension has awaited adjacent construction that will put it into use. It is located under the Schuylkill River.

Another "L" is on its way out

Soon, when work begins on a short piece of subway in Market St. just east of the Schuylkill River, Philadelphia will be on the last leg of a rapid-transit project that began more than two decades ago.

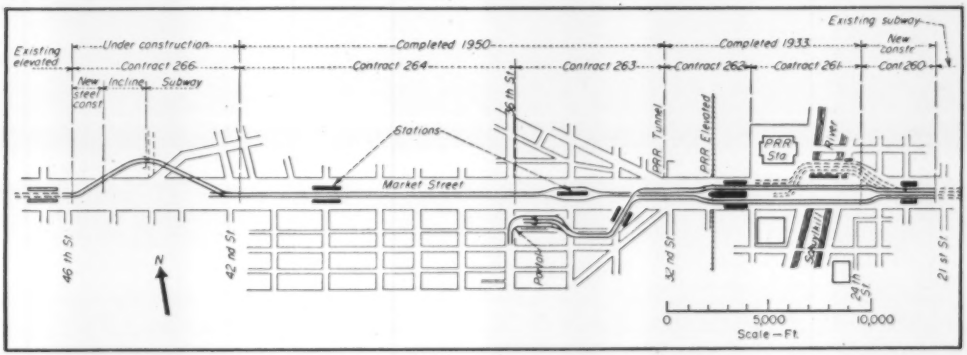
At that time the Department of City Transit began a section under the river and westward a few blocks. The engineers knew that some years would pass before the accomplishment of their long-range plans to extend the Market St. line and eliminate 21 blocks of elevated line. But they had to do the tunnel then, in the interest of economy: A new Market St. bridge of greater road width was about to be built, and the cheapest way to get the subway in place beneath was to build it in conjunction with the bridge-pier work. (ENR March 19, 1931, p. 499). Nearby terminal and other work by the Pennsylvania Railroad also were considerations.

After World War II, conditions were right to initiate the rest of the job. Two sections west of the tunnel were placed under contract (see drawing below) in 1947 and 1948. The west tie-in section was let about the time the first two contractors were cleaning up, and now the department is ready to go with the tie-in to the existing subway eastward whenever the city gives the go-ahead. Elevated removal, of couise, will come after both subway ends are tied in.

Proceeding westward from 32nd St., postwar work so far starts with four tracks, two of which shortly go left to a portal for surface-subway car operation. The other two go under Market St. to 42nd St., where they pull right to ramp upward for a tie-in with the existing elevated line.

The elevated line presented one of the first problems to contractors. Its columns had to be underpinned to points below subway grade. Much of the excavation was in weathered schist, which cut easily with air-spades and stood without sheeting. Pictures tell how the contractors did this work, subsequently transferring the "L" column loads to the cut-and-cover subway's structural frame.

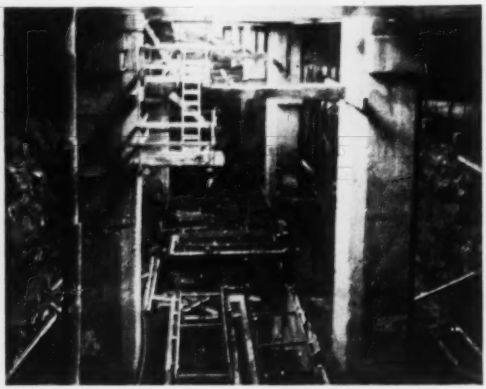
About 235 columns have been underpinned; column loads normally are 175 tons, but some run almost 400 tons. Underpinning methods varied



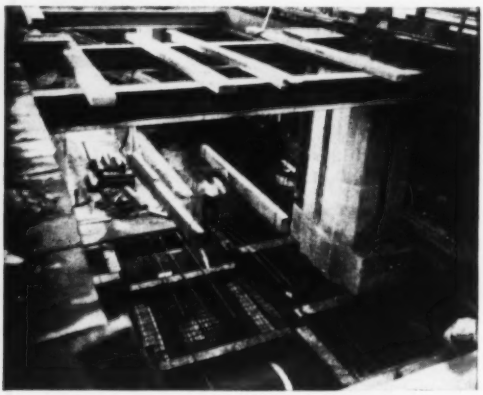
MARKET STREET EXTENSION construction map shows that tie-in to elevated at 46th St. (left) now is under way. Underground tie-in at east end (right) soon will be placed under contract. In-between structure is complete.

UNDERPINNING OLD "L" is a big part of the Philadelphia subway work. Here, Buckley & Co. transfers elevated column loads to pipe piles so footings can be supported on temporary concrete piers placed in sheeted pits.

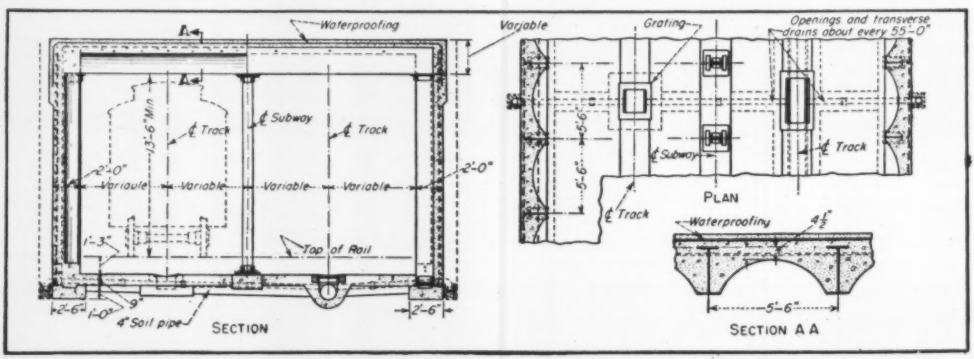
GRILLAGE LUGS, for transferring column loads to subway roof steel, are revealed as rough excavation progresses downward and exposes two rows of underpinning piers. This is a portion of the Geo. H. Flinn contract.



ON THE BOTTOM, forms for station platform are being built. Some wall steel appears behind an underpinning pier at right. Piers are right in subway track location, so they'll have to be removed before job is finished.



SUBWAY ROOF steel has been completed and now carries "L" column load. Pier below grillage lug has been removed with aid of a drifter riding on a horizontal bar frame. (Philadelphia Department of City Transit photos)



CUT AND COVER construction is conducted throughout the Market St. extension. Here is a typical cross-section in zones between stations. Height and top-beam depth vary, depending on the economy of backfill vs. cost of extra height.

among contractors only in minor ways.

Geo. H. Flinn (contract 263) used 8-ft spacing between subway frames in his contract (at underpinning piers only; normal spacing elsewhere is 5 ft 6 in.). To fit grillage lugs (see photo) to this top-beam spacing he dug his underpinning pits 6 x 6 ft in plan. Golder Construction Co. and Buckley and Co. dug 5 x 5 ft pits to accommodate 7-ft subway frame spacing.

Flinn's practice also differed in the manner of supporting runner beams for initial load-transfer. Instead of using pipe piles, he put the load on existing pavement, with cribbing.

Buckley's contract is the one with the most variety, consisting of a short stretch of subway, a concrete ramp to the surface (involving retaining walls as high as 22 ft), and a steel above-ground section that joins the existing "L" at a skew.

Because the main trusses of the old "L" are half-through, it was not possible to retain them where the skew section joined the old structure. New track had to cross the truss line at old-track grade. Deck girders were substituted in four spans affected. These girders vary in length from 40 ft. to 62 ft. Installation of one girder is shown. (Headroom is not a problem in this zone.)

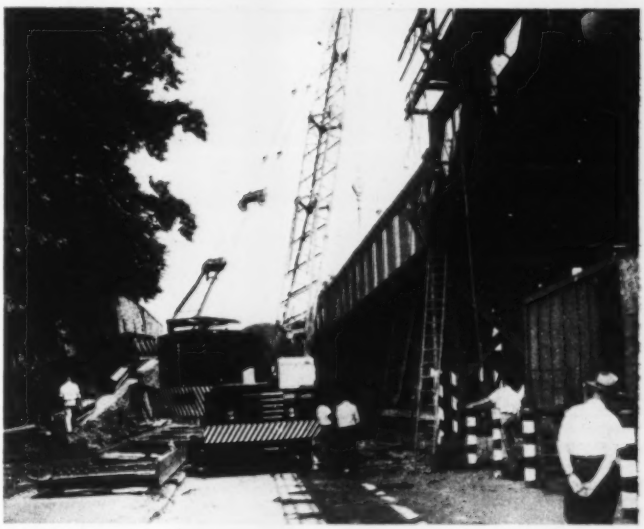
• **Concrete practice**—While structural steel plays an important part throughout the subway work, concrete is in the picture in a variety of ways. In addition to underpinning piers, encasement of the underground structure, the ramp work and other elements are of concrete. Concrete volume on the three postwar contracts amounts to 69,000 cu yd. The Department of City Transit required a so-called 3,000-lb concrete, whose ingredient proportions are fixed by long-standing department specifications and experience.

Specifications covering 61,000 cu yd on these jobs also required inclusion at the mixer of a half pound of Pozzolith, a cement-dispersing agent manufactured by the Master Builders Co. of Cleveland, Ohio. Department engineers say that, while no cement saving was deemed advisable (specifications fix the amount of cement) they are getting superior concrete. Durability, denseness for resistance to seepage, and surface characteristics all are said to be improved.

Supporting the asserted superiority of the concrete is a series of 50 cylinder tests taken on the Golder job. Seven-day strengths average 3,210 psi; 28-day strengths average 4,642 psi, with many above 5,000 psi.

Howard S. Hipwell is chief engineer for the Department of City Transit. Lawrence Costello is department director.

INCLINE CONNECTION between new subway and elevated structure beyond 46th St. runs outside Market Street's location. Note old "L" at right.



TYING-IN incline to elevated involved the removal of half-through trusses and their replacement by deck girders. Here, a girder goes to place as falsework supports old track.

CONTRACTS FOR THE MARKET STREET SUBWAY

No.	Location	Contractor	Awarded	Amount
260	21st - 24th Sts.	(Not awarded)		
261	24th - 30th Sts.	Dravo Contracting Co., Pittsburgh	9-12-30	$3,899,500
262	30th - 32nd Sts.	Keystone State Corp., Philadelphia	4- 2-31	$1,679,397
263	32nd - 36th Sts.	Geo. H. Flinn Corp., New York	9- 8-47	$7,650,000
264	36th - 42nd Sts.	Golder Constr. Co., Philadelphia	12- 6-48	$5,983,297
266	42nd - 46th Sts.	Buckley & Co., Inc., Philadelphia	10-10-50	$3,000,000

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READER COMMENT

Overseas secrecy

Sir: Your editorial "It's a game" (ENR August 9, 1951, p. 21) was timely, and I quite agree with your opinions regarding attempted secrecy on overseas airbases. As far as the African airports are concerned, one can learn quite a lot about them by reading the New York JOURNAL-AMERICAN as long ago as February 9, carrying a Washington, D. C. dateline article "U. S. Builds Atom Airports in North Africa to Block Reds." The approximate locations of 5 airfields are mentioned.

I have just returned from a four-month tour of Western Europe, the Near and Middle East, and North Africa, and I must say there does not seem to be much secrecy concerning these jobs in the countries where the work is being done. So, as you say, why all the fuss here? It would be surprising if the Soviets did not know what is being done and where. Under such circumstances it might be a good idea to let the U. S. taxpayer know a little more about what is being done with his money for his protection.

I have been a constant reader of ENGINEERING NEWS-RECORD for over 20 years, and all I can say is "Keep up your good work!"

WILLIAM H. SCHUELIE,
Eastern Representative,
Littleford Bros., Inc.

Foreign relations (technical)

Sir: On my return from a work-visit to India recently, I started catching up on accumulated reading. Among the items were your articles on India, Israel and France.

I want to compliment you on the story and analysis of "India's TVA" (ENR May 24). It is fair-minded—neither too rosy nor too pessimistic. It places the effort in proper perspective, showing its importance and significance, as well as its place in the over-all Indian development picture. In a word, it is a balanced statesman-like presentation, with enough detail to give it realism.

It is one of the very few things I have seen that would give an engineer —or other person—going freshly to work in India, a realistic sense of the problems and background that characterize conditions of work there.

Also I want to applaud a passage in the French piece (ENR April 5, 1951, p.30)—"An American viewing the French improvement is thus entitled to feel a certain satisfaction, although this feeling should stem from the fact that the novel idea of ECA is of American origin, rather than that the American taxpayer footed the bill for a foreign gift, etc." The wonder is that this sensible view is so rare—but it is.

Also, I like one other point. While it is made clear in these articles that American money, equipment and men have helped these enterprises, adequate credit is given to local skill and determination. I am thoroughly sick of American builders and others coming back and explaining how backward everything is, and how impervious they are to our better methods. In the first place, while this is partially true, it is quite a superficial statement because, when you really get down into it, they have got a good deal from which we also can learn, as I have. Second, if our methods are properly, unarrogantly and sympathetically introduced in their proper places, I have found excellent receptivity. And finally, it is so rude and does our country no little harm.

ALBERT MAYER
Mayer & Whittlesey
Architects and Engineers
New York

EDITORS NOTE: Mr. Mayer, who is a member of both the American Society of Civil Engineers and the American Institute of Architects, and chairman of the latter's Committee on Urban Design and Housing, has also done much work abroad in town and rural planning and development. In India this has included a number of pilot rural projects in the United Provinces, a master plan for a new capital city in the Punjab, and a master plan for Greater Bombay. Currently Mr. Mayer is designing a new town, Kitimat, in British Columbia, for the Aluminum Company of Canada.

Watchmaking prestressing

Sir: Without in any way attempting to disagree with the report of the MIT conference on prestressed concrete in your August 23 issue, or with the optimistic editorial on the same subject in the August 30 issue, I feel that, for the benefit of those who did not get to attend, a somewhat different reaction should be recorded. Not having a past history to act as a guide for determining what was omitted in the conference, one is lead to the impression that everything was covered.

A great deal of valuable information was included in the several papers, but

(*Continued on page 51*)

COLD FACTS ON A HOT SUBJECT

METER MANUFACTURER USES EVERY MODERN TECHNIQUE TO POUR FINEST BRONZE CASTINGS

Pouring small meter bodies in the Rockwell foundry

The quality built into every Rockwell water meter is quickly apparent by examining the outside case. You won't find any pin holes, flaws or burnished areas on the smoothly grained surface of a Rockwell casting. That's because these castings are poured in Rockwell's own modern, completely mechanized foundry under close laboratory control.

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Rockwell meter castings are made of real alloy bronze. No skimping on materials is permitted. Every casting must be made to the full 85-5-5-5 composition that is recommended for use in most meters. This material is made up of 85 per cent copper, 5 per cent tin, 5 per cent zinc and 5 per cent lead. But it takes more than fine materials to make a fine casting. It takes excellent foundry equipment, close laboratory supervision and foundry "know how"—all of which Rockwell has to a marked degree.

Green sand molds are made in multiples on a precision molding machine—cores are produced in a core blowing machine, then baked in a large temperature controlled gas fired oven. Crucible type melting furnaces reduce the metal. Every precaution is taken to make sure it is kept free from impurities. Finally the molten bronze is poured into the completed molds at prescribed temperatures that are carefully controlled by instruments.

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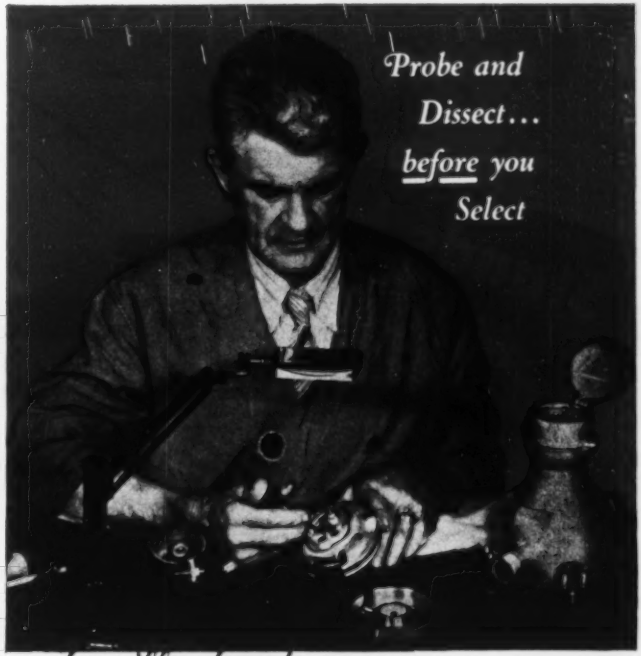
You can actually see and feel the difference in Rockwell meter castings. And this superiority carries all the way through the meter manufacturing process, right down to the final testing. Full size, full weight, full copper content meter castings are just an exterior indication of the better values built into all Rockwell water meters.



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(Continued from page 48)

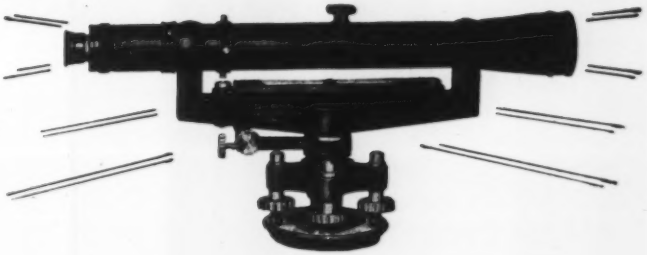
the greater portion dealt with techniques and research that are not consistent with American construction practice. As a parallel example, it is well known that we can make the best and lowest cost machine bolts and nuts but cannot compete in the open market in the manufacture of watches. It seemed to the writer that too much of the discussion centered on techniques and application of prestressed concrete in the watchmaking category.

Certainly, if the reported labor expenditure of 152 man-hours per ton of steel in the Walnut Lane Bridge is correct, there is no sense in computing the savings from a reduction in steel weight from a bridge design. Similarly, as was also reported, if special wire straightening equipment in addition to the stressing devices, clamps and gages were to be usual equipment (a wire straightening machine costing at least $25,000), the very common use of prestressing predicted in the editorial is not in the immediate future.

The writer is convinced of the many advantages of prestressed concrete, except from the point of view of economy when equal standards are used for ordinary reinforced concrete. It is interesting to see what economical designs can be devised in ordinary reinforced concrete using 80 or 90% of the concrete strength as a working strength and 90 to 95% of the reinforcing yield point as a working stress. There certainly is no economy in the prestressed designs with very thin webs or metal saving devices at terrifically increased labor costs. Homespun prestressed methods where the last percent of possible steel saving is not squeezed out and where intricate instrumental devices are not needed, in the writer's opinion, point the way toward more easy acceptance of prestressing in the construction industry. There were some mentions in the discussions of that approach, but the program was definitely without any inclusion of such practical approach.

This comment is not in any way a criticism of the conference program. It was an excellent program and carefully thought out and planned. It is quite possible that since we are following the footsteps of European practice, the program should follow European technique and disregard what the writer believes as the most important phase: a new approach to the use of a new tool. If prestressed concrete is a cure for some of the ills of reinforced concrete, let us not get involved in a maze of pharmaceutical detail but stick to the medical problem.

JACOB FELD
Consulting Engineer
New York, N. Y.



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Coated optics	YES	YES	YES
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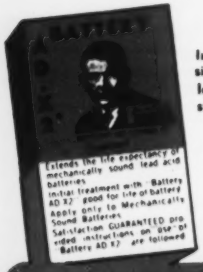
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FIELD AND OFFICE

Army photo mapping device knows all angles

A device that interprets angles on aerial photographs has passed operational tests at Fort Belvoir, the Corps of Engineers Research and Development Laboratories. Known as the photoangulator, the device gives true horizontal directions from oblique aerial photographs.

Military aerial photographs used in production of most aeronautical charts and in small scale mapping are made with three camera shootings simultaneously in vertical and oblique positions to cover a wide area. The new device makes possible the establishment of a network of intermediate horizontal control from the oblique photographs to which the map is related.

The photoangulator has three parts: A depression angle assembly for adjustment to the depression angle of the aerial camera at the instant of exposure; a photo arm under which intermediate control points are intersected on the photo; a templet arm that juts over the map manuscript to give the true horizontal directions. A plastic slide rule calculator enables the operator to obtain quickly the photo arm setting.

Total weight of the unit is 14½ lb., and the entire outfit can be carried in a weatherproof hardwood case.

Horizontal directions may be produced from 6-in. focal length photography with camera tilts ranging from 40 to 72 deg. The equipment can be used with a minimum of operator training, and is not affected by wide temperature changes, according to observers.

The basic instrument was invented by James G. Lewis of the U. S. Geological Survey and the original model was built in 1942. It has been modified after tests extended over a five-year period.

Quick way to find scale for planimeter

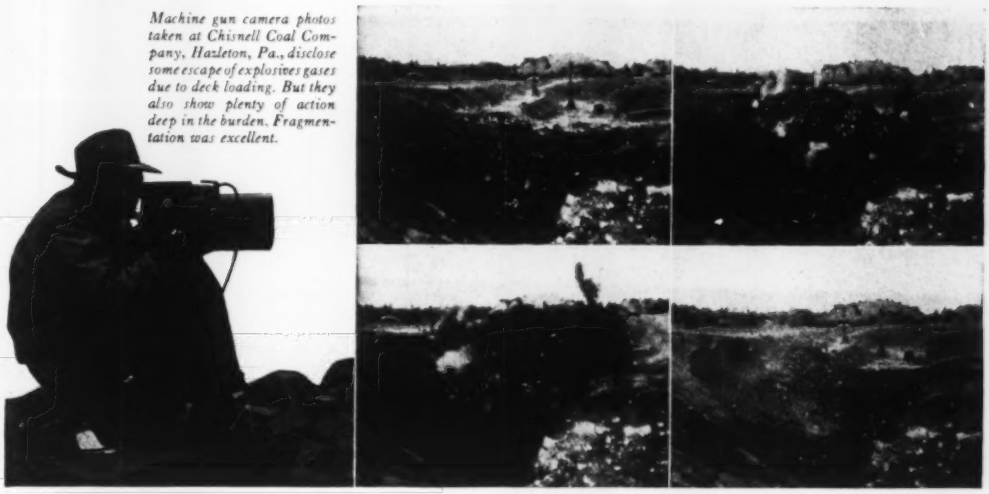
In measuring areas with a planimeter, the scale can easily be determined by laying out a one-inch square on the drawing. Without any adjustments to the planimeter, roll the square inch and read the planimeter dial. Dividing this reading into the actual area represented by the square inch gives a constant, which represents the area scale as measured by the planimeter.

For example, consider an earthwork cross section with a vertical scale of 1 in. = 5 ft and a horizontal scale of 1 in. = 25 ft. Suppose rolling a planimeter around a 1-in. square section produces a dial reading of 100. Then, since the 1-in. square represents 5 × 25 = 125 sq ft, the scale constant is 125/100 = 1.25.

If, after this, in measuring around the cross section, the dial on the planimeter reads, say 5,000, the area of the section is 8,000 × 1.25, or 10,000 sq ft—Henry F. Murphy, Construction Engineer, Architect for Federal Housing, Louisville, Ky.

What Really Happens When a Blast Is Shot?

Machine gun camera photos taken at Chisnell Coal Company, Hazleton, Pa., disclose some escape of explosives gases due to deck loading. But they also show plenty of action deep in the burden. Fragmentation was excellent.



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FOREIGN

TO SAVE 100,000 TONS OF COAL ANNUALLY—The $45,000,000 Oued Agrioun hydroelectric power project near Kerrata in Algeria is scheduled to begin operations this month. By 1954, it will supply 185,000,000 kilowatt hours a year—about one quarter of Algeria's requirements. Here shown is the switch yard for the underground plant.

Big power project in Algeria

The Oued Agrioun power project in Algeria—now about half completed—includes three dams and two separate power plants. Iril Emda is the biggest of the dams. Water from Iril Emda will be used twice to generate power. It will pass first through a 24,000-kw power plant at the damsite, then go into a tunnel and flow 5.2 miles to a deep underground power plant of 71,200 kw capacity.

Work on the project was begun four years ago. The tunnel to the underground plant was completed last year, and the power plant 100 ft below the earth's surface has just been put in operating shape. The underground power plant is 220 ft long, 56 ft wide and 72 ft high. Iril Emda Dam will not be completed until early next year. The project was financed partly by Marshall Plan counterpart funds. It will save Algeria 100,000 tons of coal a year.

34 Point 4 technicians go to 15 foreign lands

Thirty-four Point 4 technicians—the largest single group so far to take the orientation course at the Foreign Service Institute of the State Department—are completing a three-week training course before going to their posts in fifteen countries of Asia, Africa and Latin America.

Eight of the technicians are experts in public health and sanitation, one in geodetic surveying, one in aviation, fifteen in agriculture, animal husbandry and forestry, five in education, and the others in fields such as industrial hygiene and business administration. Two of them are women.

The course—open also to wives of technicians—emphasizes the understanding of foreign peoples, their customs, religions, cultures and languages.

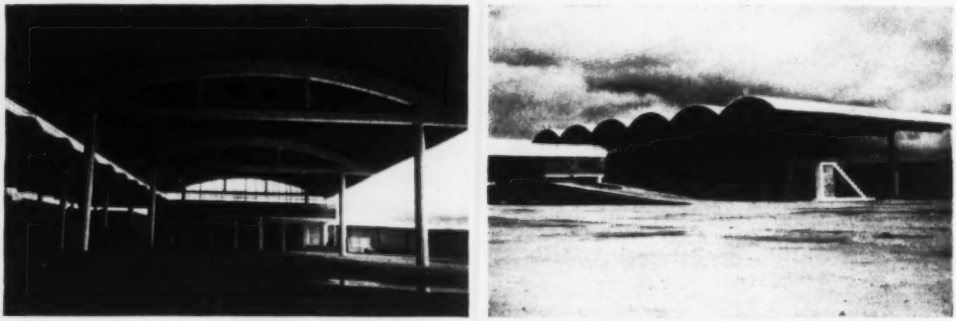
Point 4 technicians in the current FSI classes include:

Pietro Vigna, of Washington, D. C., will be chief of the U. S. Civil Aeronautics Mission to Costa Rica. He holds a civil engineering degree and has had 12 years experience in CAA airport construction. He was a member of the CAA missions to Colombia and Peru and chief of mission to Bolivia.

Lt. John O. Boyer of San Jose, Calif., has been assigned as technical adviser on geodetic surveying to Liberia. He holds a degree from the University of Santa Clara, and is a commissioned officer of the Coast and Geodetic Survey, where he has served for nine years.

Robert R. Williams of Phoenix, Ariz., will go to Liberia to advise on hydroelectric development. In this

(Continued on page 56)



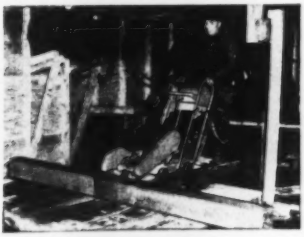
THIN-SHELL ROOF—Bus terminal designed by Ortega, Sclano y Gonzales Zuleta, of Bogota, Colombia, for Empresas Municipales de Bogota, has a relatively thin concrete roof for the long spans involved. It was constructed by placing hollow tile about 8 in. apart on wood forms and covering them to a depth of only 2 in. with concrete. Steel bars were placed between the tiles to reinforce the 6-in. deep ribs. Bays in the repair shop, left, are 40x80 ft. and in the service station, right, 31 ft square, with 15½ ft cantilevers at the sides and ends of the building.

CONSTRUCTION EQUIPMENT NEWS

A Preview of Equipment That Will Help You On the Job

PATCHES—TRENCHES SAWED FOR FLOOR—STREET REPAIR — Saw concrete floors, walks or streets! Saw narrow slit trenches 1" wide for conduit or any width for utility lines. Eliminate jackhammer fractures beyond the straight, smooth sawed lines.—**Write Clipper Mfg. Co., 2812 S.E. Warwick, Kansas City 8, Mo.**

FLOORS, DRIVES, RUNWAYS EASILY CUT FOR REPAIRS—Rail tunnels, rail and pipe trenches, air lines and machinery bases were cut in dense concrete with a Model C-130 Clipper Concrete Saw and CDS-20 Diamond Blade at the rate of 5′ per minute—3" deep. Tremendous savings were claimed by the contractor in removal and replacement.—**Write Clipper Mfg. Co., 2812 S.E. Warwick, Kansas City 8, Mo.**



TRACK SAW NOW CUTS LARGEST STONE, TRANSITE, TERRA COTTA — By placing C-15 Clipper Concrete Saw on tracks, a Cleveland contractor cut limestone veneer units from 15′x7"x15" quarry lengths. In addition to large, bulky shapes this model is efficient and dustless for inside patch and trench work.—**Write Clipper Mfg. Co., 2812 S.E. Warwick, Kansas City 8, Mo.**

CONTRACTION JOINTS NOW SAWED—Floors, walks, drives and runways now poured continuously (reduces bulkheading!) Then joints are sawed to eliminate hand forming and costly spalling.—**Clipper Mfg. Co., 2812 S.E. Warwick, Kansas City 8, Mo.**

STUDIES OF SAWED JOINTS PROVE VIRTUAL ELIMINATION OF SPALLING — Highway transverse joints sawed 2" deep are devoid of spalling after 1½ years in contrast to heavy spalling in a few weeks on formed joints, according to State tests.

Typical spalling after few weeks heavy traffic.

Sawed joints on same highway after 1⅛ years.

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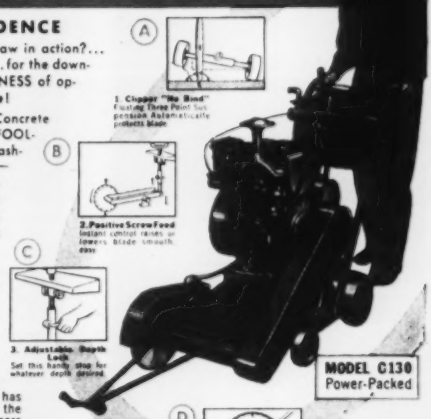
*A pivoting front axle keeps the blade straight in the cut even on rough surfaces—stops binding—stops excessive blade costs.


A
1. Clipper "No Bind" Floating Three Point Suspension Automatically protects blade
B
2. Positive Screw Feed Instant control raises or lowers blade smooth, easy
C
3. Adjustable Depth Lock Set this handy stop for whatever depth desired
D
4. Patented Spray Control Its value is measured in increased blade life
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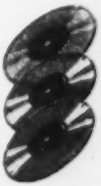

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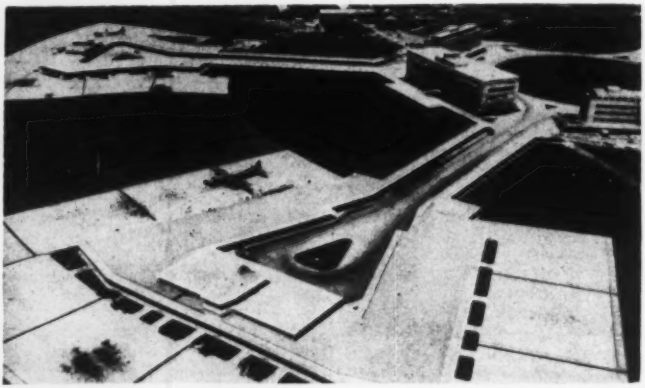
Foreign . . .



ARGENTINIAN AIR TERMINAL—This is an aerial view of part of the Ministro Pistarini Airport near Buenos Aires. This is said to be the largest airport in the world, the area of 56 sq mi, including large parks where 3,000,000 trees have been planted. The runways are on high ground with easy drainage of surface water, and in which the subsoil has such a high compactivity that the runways could use this subsoil as a subbase, with the consequent saving. The economy thus achieved was more than the total cost of all the land purchased. The airport is reached by a 2-lane express highway 10 miles long connecting with the highway which circles the city. A continuation extending 3 miles into the city limits is under construction. A tangential layout of six runways in parallel pairs has been adopted. In the foreground is the air station building and national terminal. In the background and the extreme right are the hotel and postal-customs building.

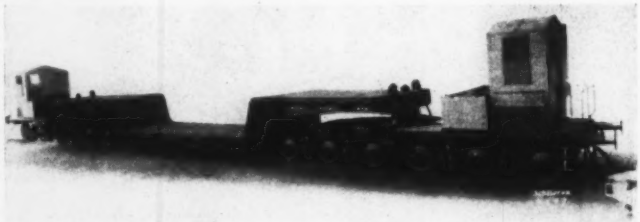
Point 4 mission, he will represent the U. S. Department of Interior, Bureau of Reclamation. He holds a civil engineering degree from Illinois Institute of Technology. Williams headed design groups for the Davis and Parker Dam projects undertaken on the Colorado River.

Jack H. Lair of Seattle, Wash. will go to Iran as a U. S. Public Health technician with the Point 4 village improvement program. After receiving a B.S. degree from the University of Washington, he served as chief sanitarian, Seattle-King County Department of Health.

Robert Neal Rabideau of Seattle, will go to Iran to advise on environmental sanitation. He holds degrees from the University of Washington, and has done sanitation work with the Seattle-King County Public Health Department.

Percy W. Liles, sanitary engineer of Wilmington, N. C., has been assigned to the Institute of Inter-American Affairs Health and Sanitation mission in Paraguay. Liles has been sanitary engineer for the U. S. Civil Affairs in the Ryukyus Islands for the last four years.

(*Continued on page 58*)



LOW BED FLAT CAR—A "well wagon" or low bed flat car with a capacity of 132 tons where the load is distributed over a short well has arrived in India from Switzerland. The car was especially built to transport heavy machinery from ports to sites of hydro-electric projects such as those in the Damodar Valley scheme. From buffer to buffer, the wagon is 90 ft 5 in. long and 56 ft 7 in. between its main pivots. It is of all-welded construction, thus reducing tare weight from 115 to 90 tons. The main girder is supported by especially-designed pivots cushioned with rubber springs to take initial shocks on two sub-structures in turn supported by two 6-wheeled trucks.

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Foreign . . .

More power developed in Scottish highlands

In the five years since the war, the North of Scotland Hydro Electric Board has added 50% to hydro power capacity of the country. It has built and put in operation 199,700 kw in 6 new plants and has 299,300 kw under construction at 7 other sites.

When the board was set up in 1943, to develop power in the Highlands, Scotland's total installed capacity was 299,000 kw. It is now 398,700 kw. Counting the projects completed, those under way (229,300 kw), just starting (198,200 kw), designed (8,100 kw) and under survey (278,500 kw), the hydro program of the board adds up to 913,800 kw. Some 2.6 billion kw hr of electricity can be generated by these new plants, an amount that can greatly alter the economic pattern of a country that generated only 1.4 billion kw at the end of the war.

Most of the projects are small—up to 30,000 kw—but there are several that are larger. Of those completed the Sloy station on Loch Lomond is the largest (130,000 kw). Another large completed station is Clunie at 61,200 kw. Errochty, under construction, will have 66,000 kw installed and Affric 66,000 kw. Extensions still under survey for Affric may add 125,000 kw more.

Foreign briefs . . .

• **Safe water in Korea**—Army spokesmen claim that new equipment used in mobile water purification units makes safer drinking water than World War II troops drank. New units are said to be far more effective in removing amoebic cysts, cause of amoebic dysentery. A 35-gpm unit hauled on a 2½-ton truck and operated by four men provides soda-ash and alum coagulation; settling in a 3,000-gal tank; chlorination; odor and taste control with activated carbon; diatomite filtration.

• **France needs skilled workers**—France needs at least 150,000 additional skilled building trades workers for the nation's reconstruction program, according to a report by the council of the republic's committee on apprenticeship. The shortage of masons is most acute, the report says. It estimated that at least 100,000 additional masons are needed—almost as many as now employed. The report says at least 10,000 more carpenters, 15,000 more plumbers, 10,000 cabinetmakers, 10,000 ironworkers and 5,000 to 15,000 other skilled workers.

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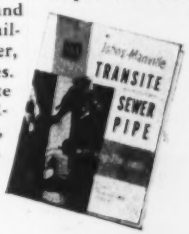
Whether you plan to extend existing sewer lines, or build a complete new system, you'll want to check into the money-saving possibilities offered by Transite Sewer Pipe with its new Ring-Tite Couplings.

Without the need for hot jointing compounds, this factory-made coupling is quickly and easily assembled to make a tight joint that stays tight in service. This, plus the fact that Transite's long 13-foot lengths mean fewer joints in the line, cuts infiltration to a minimum. Thus, the load on the disposal plant is cut down, treatment costs reduced, and plant capacity conserved for future needs. And, in the planning of new systems, smaller treatment plants and smaller diameter sewers may be considered . . . with resultant savings in money, time and labor!

Important installation savings are possible, too, with Transite Sewer Pipe. Its relatively light-weight, long 13-foot lengths, and easy-to-assemble Ring-Tite Couplings speed completion of the line. It can be readily cut on the job for closures and branch connections. And its high flow capacity (Manning's n=.010) often permits flatter grades and shallower trenches with savings in excavation, sheeting, etc.

Transite Sewer Pipe is made of asbestos, cement and silica by a special Johns-Manville process which develops maximum strength and corrosion-resistance. It is available in sizes to 36" in diameter, for non-pressure sewer lines. For further information, write for your copy of folder TR-103A. Address Johns-Manville, Box 290, New York 16, N. Y.



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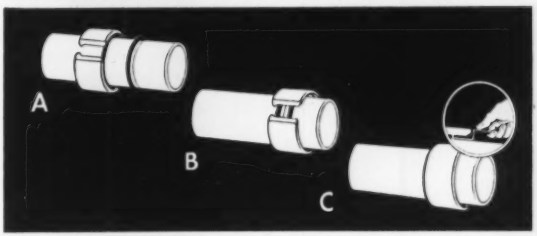

(a) Start of assembly. Two rubber rings and a Transite sleeve (cut away to show position of rings) are placed on one of the two pipe ends to be joined; (b) Final position. Sleeve centered over both pipe ends, with the rubber rings tightly compressed between sleeve and pipe; (c) Checking joint for proper assembly. This is done with a simple gauge immediately after the joint is made . . . *before backfilling.*

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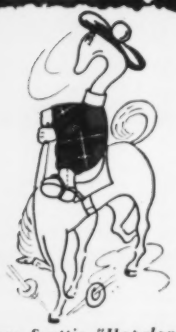

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MUNICIPAL AFFAIRS

Plan to transform Toronto's islands to make them revenue-producing

A multi-million dollar plan to make the islands on Toronto's Lake Ontario water-front into a paying amusement and recreation area for the many instead of a losing recreation area for the few, as at present, has been announced by the Toronto Harbor Commission. Under the plan, the numerous small islands will be joined together by new bridges and filling in to increase the area from 981 to 1,001 acres.

The city council will vote soon on the plan, which calls for a vehicular tunnel to be built under the western entrance to the Toronto Bay and a 4-lane motor roadway along the entire island, terminating in a bridge across the eastern entrance to the bay. Car parking areas for 11,000 cars will be provided.

The airport at the western end is to be enlarged to 247 acres, the grade of the islands is to be increased to at least 252 ft above sealevel, a 280-acre amusement and sports center is to be built, also a regatta course 1¼ miles long and 350 ft wide, and apartment and shopping centers will replace many wooden private homes and small hotels.

The plan will receive the bulk of its revenue from the residential and commercial areas to be built. At present with municipally-owned ferry service and maintenance costs for the parks, and fire and police staffs on the islands, the city loses $1,000 a day.

Flooding of parts of the islands has been prevalent in recent years. The seawall on the lake side breaks down during heavy winter storms and crushing ice. It is planned to take the topsoil off various areas, add sand and other fill, and replace topsoil so that the island level will be at least three feet above highest recorded flood level.

The city of Toronto owns all of the islands and leases the land for residential and commercial purposes on a 21-year basis. Last year taxes brought in $160,000, while city service costs totaled $250,000, exclusive of transportation losses for the ferry service, which amounted to $278,000.

Portland to build conduit to boost water supply

Although Portland, Ore., has a water system presumably ample for a population of a million persons, the city and surrounding districts, with not more than half a million population, this past summer found itself on a water rationing basis. Lawn and garden sprinkling were banned entirely for a short period.

(*Continued on page 62*)

Ready $6.9 million N. Y. bridge job

The City of New York will start within a few weeks on a long-planned $6.9 million reconstruction job on the Queensboro Bridge, spanning the East River to join the city's Queens and Manhattan business and residential areas, officials said last week.

Envisaged since the city discontinued operating a two-track elevated railroad line across the upper deck of the 40-year-old cantilever structure, the program is expected to increase the bridge capacity from its present 86,000 to more than 100,000 vehicles daily.

In detail, the program will include: Removing ties and rails of the "El." line, and decking over the area with an open-grid flooring, to provide two additional traffic lanes on the upper deck (a two-lane paved roadway already is in use); ramp connections to the upper roadways in Manhattan and Queens, and improvements to approaches.

Plans for the improvements were prepared by Parsons, Brinckerhoff, Hall and MacDonald, New York City.

• **Recalls controversy**—The plan to use the full upper deck for highway traffic recalls a controversy over the bridge's safety that started with the collapse of the Quebec bridge (of similar construction) in the early 1900's.

At that time, special boards of consultants were called in by the city's then Department of Plant and Structures to review the safety factors in the design (Engineering News, 1908, Vol. II, pp. 516, 525, 561, 677, and 1909, Vol. I, pp. 664, 669). After considerable study, heavy iron curbings originally called for, and some extremely heavy members were eliminated from the structure.

Public Works Department engineers said last week, however, that installation of the open-work roadway on the upper deck will in fact add a greater safety factor to the bridge, since the weight will be somewhat less than that of the rail line.

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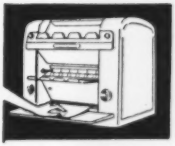

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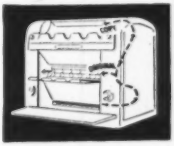

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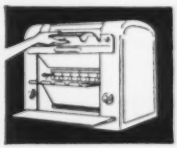

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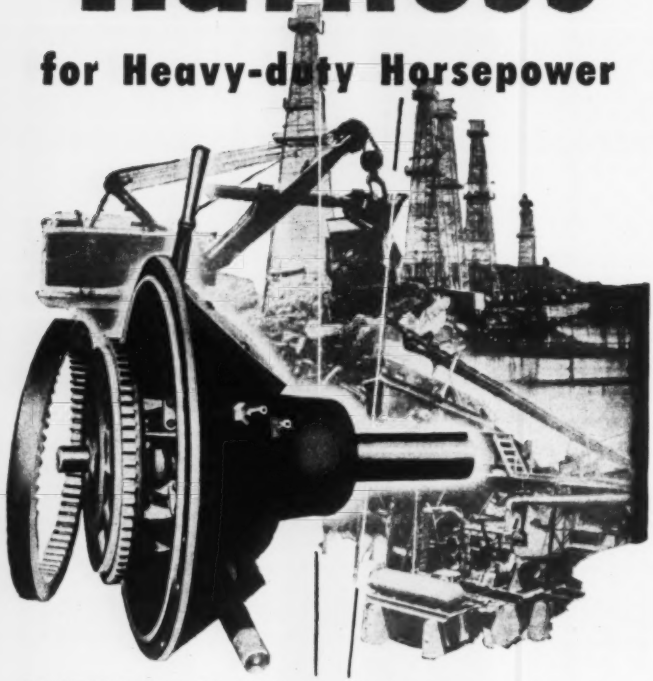

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Municipal . . .

In an area having an annual normal rainfall of more than 40 in., and with nearby snow-capped mountains feeding hundreds of streams, water supply would seem to be one problem Portland would never have to face. But a long period of rainless days through May, June, July and August so increased the water demand that restrictive measures were necessary to insure protection against fires.

Portland doesn't blame its water shortage on nature. The supply was there, impounded 14 billion gal strong in reserves on the slopes of the Cascade range only 30 mi from the city. It was the lack of facilities for bringing this water to the consumers that caused the trouble.

Now the city has set about to remedy the situation.

Portland's water supply comes from two lakes. One, Bull Run, a natural body of water, holds a reserve of 3 billion gal. The other, Lake Ben Morrow, backed up 3½ mi by a dam in Bull Run River, holds an additional 11 billion gal.

Three conduits, with a combined capacity of 150 mgd, carry water from these reserves to six reservoirs and 23 tanks and stand-pipes within the city. The reservoirs have a combined capacity of 166½ million gal, and the tanks and stand-pipes add 16½ million gal, making the total storage capacity within the city 183 million gal.

To prevent a repetition of this year's shortage, the city council has approved plans for construction of a fourth conduit of 100 mgd capacity. The new conduit will replace the smallest of the existing lines, having 25 mgd capacity, thus providing a net gain of 75 million gal. The program also calls for an additional reservoir of from 50 to 100 million gal capacity.

Surveys for the project have been completed and the city plans to advertise for bids this fall. Cost is estimated at $10 million, of which $7 million will be for steel pipe. The National Production Authority has been asked to allocate materials for the pipeline, including 16,000 tons of steel for the pipe, which will measure 66 in. in diameter in the upper stretches and 55 in. at the lower level. First allocation of 2,500 tons will be available this fall.

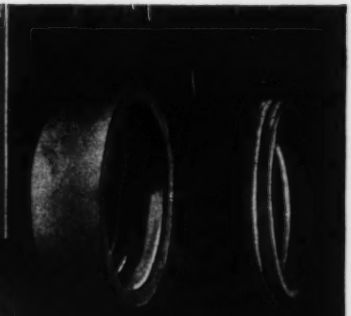
The project is in the main a gravity system, pumped water being less than 7% of total consumption.

Municipal briefs

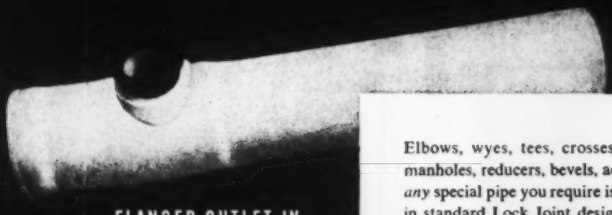
• **Phoenix wants action**—Three floods in six weeks have prodded city offi-

(*Continued on page 65*)

"Specials" are a Specialty of LOCK JOINT...



ADAPTORS—
LOCK JOINT TO
CAST IRON PIPE



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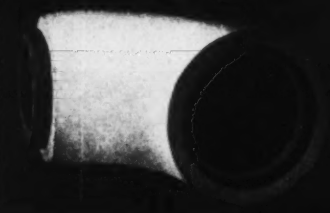
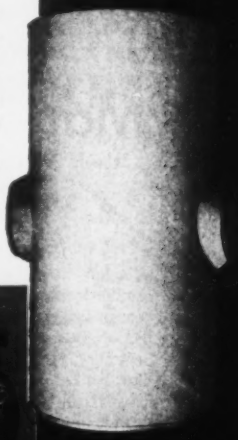
Elbows, wyes, tees, crosses, outlets, manholes, reducers, bevels, adaptors... *any* special pipe you require is available in standard Lock Joint design. And if standard specials won't do the job, "special" specials may be designed to individual specifications. Lock Joint Concrete Pressure Pipe can be connected swiftly and efficiently to any standard water pipe of other material. All specials are engineered with the same care and high safety factor that have made Lock Joint the pipe of unexcelled durability and dependability.

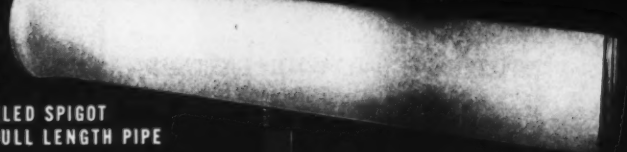


LOCK JOINT 90° ELBOW



CROSS IN FULL
LENGTH PIPE

LOCK JOINT TEE



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Municipal . . .

cials at Phoenix, Ariz., into rushing a $30,000 storm sewer project to drain one of the town's busiest intersections. The Central and Roosevelt streets job was scheduled for delay until after the winter tourist season but the third flood, and howls of marooned merchants, brought a speedup of planning. Bids will be called for soon for the project which will tie the low area with the city's main flood sewer.

• **Sports arena**—Mayor Haydon Burns of Jacksonville, Fla., has announced that the city will shortly issue certificates of indebtedness for the purchase of six blocks of land adjacent to the Gator Bowl for the construction of a sports arena seating 8,000 and a baseball park seating 6,500. The city has authority to issue up to $980,000 in revenue certificates for this project. "But how about materials?" citizens ask.

• **Master plan wanted**—A plea for a master plan for Jamestown, N. Y., devised by commercial planners to insure the city's orderly growth, has been made by Allan Bloomquist, of the City Planning Commission. He recommended that the city council provide funds so that the planning commission might hire a firm of city planners. The Jamestown Zoning Board, he said, has found it difficult to make intelligent decisions on zoning appeals chiefly because of the lack of a working master plan.

• **Dallas grows fast**—The rate of the growth of Dallas, Tex., is indicated by the fact that 1,100 new streets have been added to the city in the last two years. This is shown by the new Dallas city map just out.

• **Tax exemption sought**—Lewiston, Me., officials are planning to go to court seeking exemption for the city water department from the Maine sales tax. Assistant Attorney General Boyd L. Bailey, assigned to the State Taxation Bureau, said he and Lewiston City Solicitor Frank M. Coffin are preparing to file declarations in an equity action for an early term of Superior Court. The city contends, Bailey said, that it distributes water as a part of the city services, but does not sell it as personal property. It claims that the receipts from the water service go into the city's general fund, and therefore constitute a tax, which is not taxable under the sales tax law. Bailey said the state will argue against this theory, and that evidence that the charge is made for a sale is furnished by the fact that persons failing to pay their water bills lose the service.

TIMBER FOR INDUSTRIAL CONSTRUCTION

121' Monocord timber trusses for saw-filing room designed and fabricated by Weyerhaeuser Timber Company, Tacoma, Wash.

The need for clear floor space in industrial buildings is provided nicely with clear span timber trusses.

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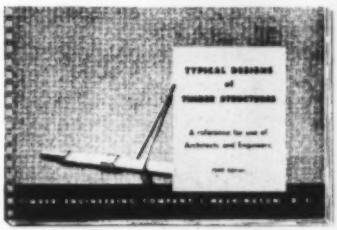
This edition features 88 new typical lumber designs based on the National Design Specification published by the National Lumber Manufacturers Association. Designs for light and heavy frame buildings of all types are featured.



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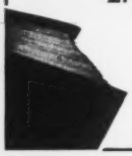
2. Explains business methods that make home building more profitable. Gives a practical understanding of the economic factors determining the market for your product. Covers every important aspect from preparing a project site, to selling the finished building. **By B. K. Johnstone, Carnegie Inst. of Tech., and C. E. Joern, Wm. Joern and Sons. 289 pages, 174 illus., $4.00**



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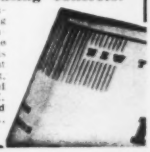

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MEN AND JOBS

APWA OFFICERS—Left to right, are Milton Offner, vice-president of the American Public Works Association and secretary of the Board of Public Works, Los Angeles; Edward J. Cleary, president of the APWA and executive director and chief engineer of the Ohio River Sanitation Commission, Cincinnati; and Alan H. Rogers, vice-president of APWA and superintendent of public works, Garden City, N. Y. (see ENR Sept. 20 page 26)

New Appointments

Highway departments

George E. Wolf has been appointed assistant engineer for the Missouri Highway Department, at Jefferson City, replacing **Frank L. Stuckey**, now division engineer at Hannibal.

Harold E. Chard is assistant chief engineer of Minnesota highways. E. J. McCubrey succeeds him as district engineer for the Twin Cities area.

N. E. Sprague is now district engineer, Illinois highways, at Paris Ill., succeeding the late Geo. A. Somerville.

State, city and county

Franklin C. Wood is executive director of the Bucks County, Pa., Planning Commission, formed because of industrial developments like the new Fortress Works of U.S. Steel near Morrisville.

R. M. Contois is southeast district engineer for the Louisiana department of public works.

William H. Moore, formerly engineer for the Ohio Highway Department, has been named temporary superintendent of highway maintenance and sanitation for Akron, succeeding the late Robert Willems.

Leslie B. Allan has been appointed civic works commissioner for Toronto, Ont., succeeding the late Murray Stewart.

Carl F. Schultheis, Jr., has been named chief of the bureau of structures for the city of Dayton, Ohio succeeding Karl Woditsch, now assistant service director.

Harry H. Denning, former engineer for the Wakefield, Mass., Department of Public Works, and before that superintendent of the highway department for 19 years, recently began his duties on a new air base construction project near Fairfield, Maine.

Industrial and Commercial

Harold C. Weingartner has been elected vice-president and general manager of the Equipment Division of National Research Corporation, Cambridge, Mass.

A. Kingsley Ferguson is assistant to William Collins, president, Walter Kidde Contractors, Inc., N. Y. City.

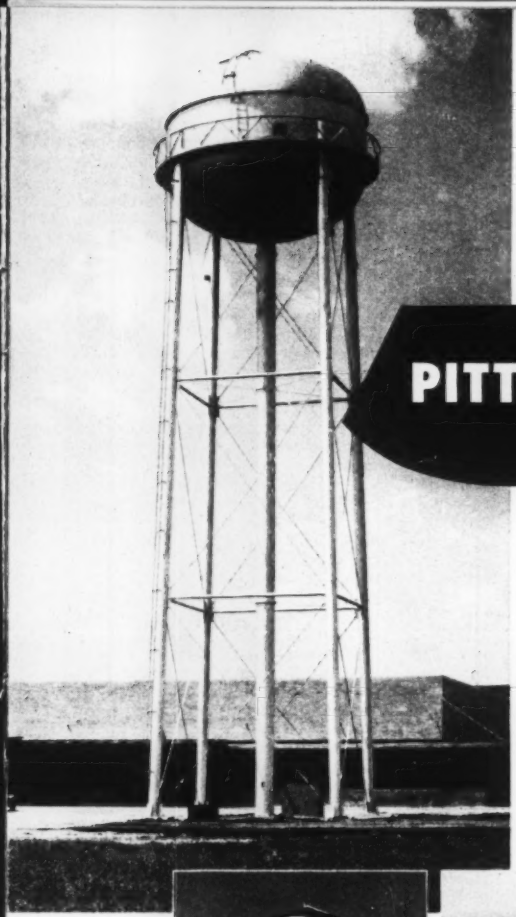
R. A. Emmerson is chief engineer of the Canadian Pacific Railway, succeeding John E. Armstrong, retired.

Honors

In recognition of 25 years or more of meritorious service, four employees of the Indianapolis Water Co. were awarded the John H. Hurty Service Award, by the Indiana State Board of Health. They were **Harry E. Ameter, Genry Northington, Granvel H. Hazel, and Howard W. Niemeyer.**

Prof. Gordon M. Fair, chairman division of engineering sciences and

(*Continued on page 68*)



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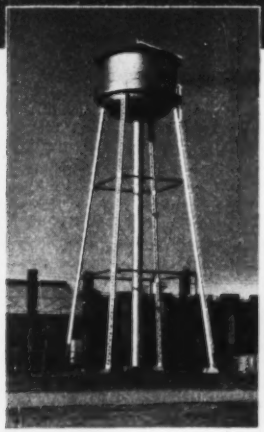

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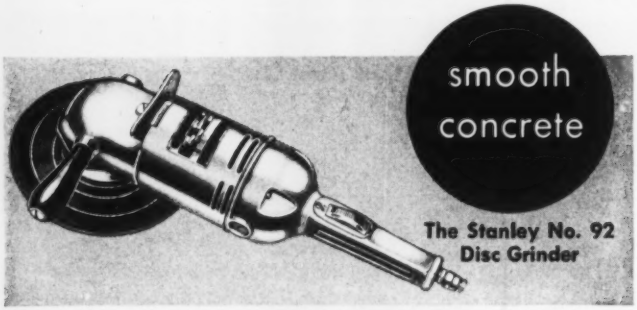
Here's a "must" tool on any construction job. The husky Stanley No. 610 is the ideal grinder for on-the-job sharpening of chisels, drills, crowbars, claws, etc.—all those important edge tools that high worker output hinges upon.

Powerful 1 h.p. motor drives two 10" wheels (one coarse, one fine) at 1800 r.p.m. (with 60 cy., a-c power). Seal-type ball bearings, mounted close to wheels, minimize vibration—give smooth, almost frictionless drive. Safety end covers easily removed for changing wheels.



For that final surface finishing on poured concrete forms, the Stanley No. 92 is the all-'round star performer among power tools. Also useful for grinding welds, sheet metal joints, and other smoothing work on stone or wood.

The Stanley No. 92 is designed especially for the toughest duty. Powerful universal motor drives 6" flare cup wheel or 9" disc efficiently and without heating under continuous use. Side handle can be used on either side.

See the No. 610 or No. 92 grinders at your Industrial Distributor's. For detailed literature write Stanley Electric Tools, 438 Myrtle St., New Britain, Conn.

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Men and Jobs . . .

former dean of the graduate school of engineering, Harvard University, was accorded the degree of honorary doctor of engineering by the Technical University of Stuttgart, West Germany. Dr. Fair is a director of the Rockefeller Foundation.

Wm. A. Xanten, superintendent, Division of Sanitation, Washington, D. C., was named as the first recipient of the Charles Walter Nichols award at the AWWA meeting in Detroit. This $500 cash award for outstanding achievements in the field of sanitation (ENR, Oct. 26, 1950, p. 26), was presented to him "for his consistent leadership over many years in the development, operation and management of refuse disposal facilities in our nation's capital; climaxed last year by the construction of a refuse transfer station incorporating a unique dust and odor-control system," (ENR Sept. 7, 1950, p. 35). In presenting the award, the association's new president, Edward J. Cleary (ENR, Sept. 20, p. 26) said: "This pioneer facility ranks as one of the most important in community sanitation."

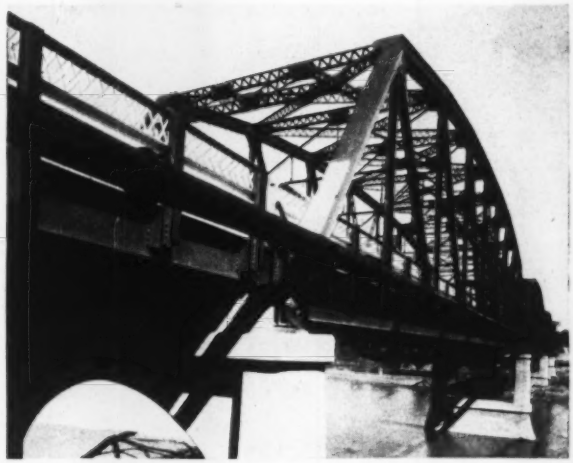
Honorary memberships in APWA were presented to four men for their long and distinguished service in public works engineering. They are: **Frederic H. Bass,** Ann Arbor, Mich.; **Samuel A. Greeley,** Chicago; **Donald C. Stone,** Washington, D. C.; and **Wm. J. Galligan,** Chicago. Fourteen members of the association received the Samuel A. Greeley Award which recognizes more than 30 years' service with a single city. They were: W. L. McFaul, city engineer and manager of waterworks, Hamilton, Ont.; **Guy C. DeWitt,** senior engineer, Utica, N. Y.; **Harold L. Andrus,** director of public works and city engineer, Kalamazoo, Mich.; **George H. Elliott, Jr.,** associate engineer, Baltimore, Md.; **Morris M. Cohn,** public health engineer, Schenectady, N. Y.; **Andrew F. Marsch,** assistant engineer, Bureau of Streets and Electricity, Chicago; **Eldred H. Walker,** associate engineer, Rochester, N. Y.; **Phil J. Divver,** superintendent of public works and grounds, Marysville, Calif.; **John S. Flockhart,** supervising engineer, Bureau of Sanitation, Newark, N. J.; **George W. Andress,** engineer in charge, Bureau of Streets, Newark, N. J.; **Wendell R. LaDue,** superintendent and chief engineer, Bureau of Water and Sewerage, Akron, Ohio; **Louis Schneider,** assistant director of public works, Philadelphia, Pa.; **Leo P. Gallen,** chief, Bureau of Street Cleaning, Philadelphia, Pa.; **Albert W. Moser,** associate engineer of design, City Plans Division, Philadelphia, Pa.

Got EXPANSION-CONTRACTION problems in the pipeline you're designing?

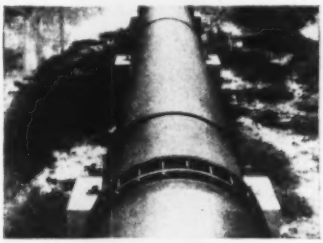
Provide an economical solution to expansion-contraction troubles in your pipeline plans. Specify a Dresser-Coupled steel line. Dresser Couplings are designed to absorb longitudinal stresses that spring leaks and build up maintenance costs on other lines. Dressers can be installed in minutes, using only a wrench, and no special skill is needed. And once installed, you have a permanent, "Flexible-Tight" line that gives years of virtually maintenance-free service.

Dresser Couplings on every joint eliminate the need for expansion joints. However, for lines subject to extreme longitudinal stresses Dresser Expansion Joints are your best solution. They're field proved for many years on oil, gas, water, gasoline, low-pressure steam, and other piping . . . and they're economical . . . easy to install.

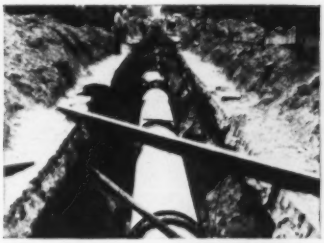
Mail the coupon below for detailed information on Dresser Expansion Joints . . . and engineering reports on recent Dresser Coupling installations.



A 16" Dresser-Coupled water line across the Colorado River at Grand Junction, Colorado. Dresser-Coupled to assure Flexible-Tightness despite longitudinal stresses and traffic vibrations that would open a rigid line. Easily installed Dressers have given dependable service here since 1933.



A section of Savannah's new 42" Dresser-Coupled water line crossing swampy ground on concrete pile bents. Flexibility of couplings protects line against stresses.



Another Dresser-Coupled installation in Chicago, Ill. Dressers harmlessly absorb underground stresses beneath city streets where joint failures would be extremely costly.

Style 63 Dresser Expansion Joint—one of 4 types available to accommodate pipe movements up to 10" and more. Efficient, well-proved, and economical for most all types of lines.

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"FLEXIBLE-TIGHT" COUPLINGS

Dresser Manufacturing Division,
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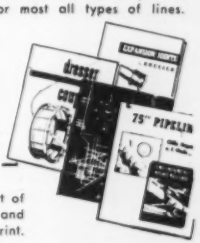
(One of the Dresser Industries)

GET THESE FOLDERS NOW!

Interesting engineering data on varied types of lines installed with Dresser Couplings. Also Expansion Joint Catalog. This is file material.



Gentlemen: Please send me your "Report of Dresser-Coupled Lines", Expansion Joint and Style 38 Catalogs and "Bridge River" reprint.

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PHILADELPHIA

Photo courtesy of Philadelphia Chamber of Commerce

Skyline of historic Philadelphia as seen from the Philadelphia Museum of Art looking toward the center of town along the Benjamin Franklin Parkway.

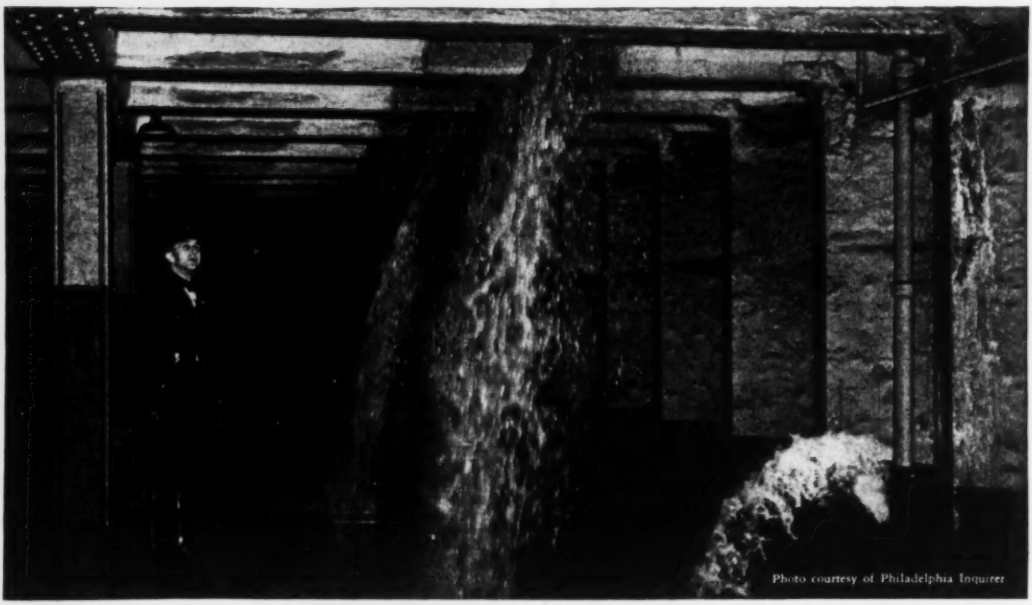


Photo courtesy of Philadelphia Inquirer

The scenic and well-planned municipal picture (seen at top of page) formerly was frequently spoiled by flooding occurring in the below-ground subways.

Subway Flooding

RELIEVED BY ALLIS-CHALMERS 'SW' PUMPS

UNDER PHILADELPHIA'S HISTORIC STREETS, trouble used to strike after heavy downpours. Sudden rainstorms or main breaks frequently would feed water into the subways faster than it was removed, interrupting service. (See photo at lower left.)

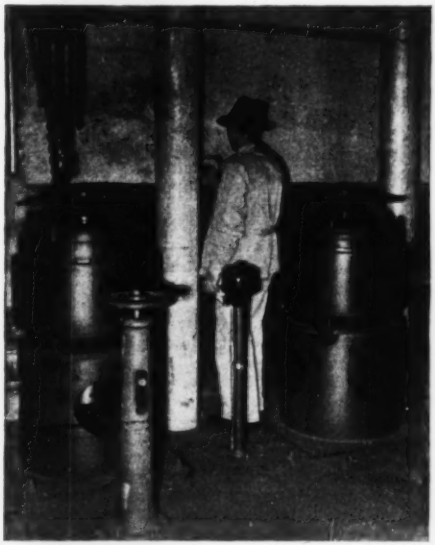
Since the subways are vital in providing transportation for this third most populous city in the U. S., these service interruptions could not be tolerated. And since the duty required positive and rapid response even though operating automatically and unattended, reliability and long life were important.

Allis-Chalmers, builders of the world's widest line of public works equipment, supplied the equipment to adequately dewater the Philadelphia subway. "SW" centrifugal sewage pumps, induction motors and transformers (all seen below as installed at the Wyoming station) were selected.

Two pumps are being installed at each of the six previously affected stations on the Broad Street subway. Located in dry wells alongside the wet well reservoirs, these emergency flood pumps automatically whirl into operation when the water level rises. They pump the water from the subways into the city sewer system at a rate of 6000 gallons per minute at each station.

Built in ratings up to 11,500 gpm, these new "SW" sewage pumps are liberally engineered to be suitable for critical, intermittent and unattended operation. The shaft is of extra heavy, heat treated carbon steel; sleeves are hardened stainless steel; anti-friction bearings are extra large, adjustable from the exterior. And the wear resistant casing is split radially for quick maintenance without disturbing intake or discharge piping.

When *your* city plans modernization or expansion, take advantage of Allis-Chalmers experience in designing and building public works equipment. For detailed information ask for bulletins . . . "SW" pumps, 08S7504; centrifugal pumps, 08B6146A; complete public works equipment, 25B6607. Call your nearest A-C office or write to Allis-Chalmers, Milwaukee 1, Wisconsin. A-3486



Allis-Chalmers 60 hp induction motors drive Philadelphia City Transit subway pumps. Contractor for the installation was the William A. Bulman; equipment supplied through A-C Supply Co. of Philadelphia.

Allis-Chalmers "SW" centrifugal pumps in dry well as seen from above. They are driven from motors above by 12 ft shafts equipped with universals.

Power is supplied at full voltage from these Allis-Chalmers 37.5 kva *Chlorextol* liquid filled distribution transformers right at the load.

Chlorextol is an Allis-Chalmers trademark.

Installation photos courtesy of Dept. of City Transit

ALLIS-CHALMERS

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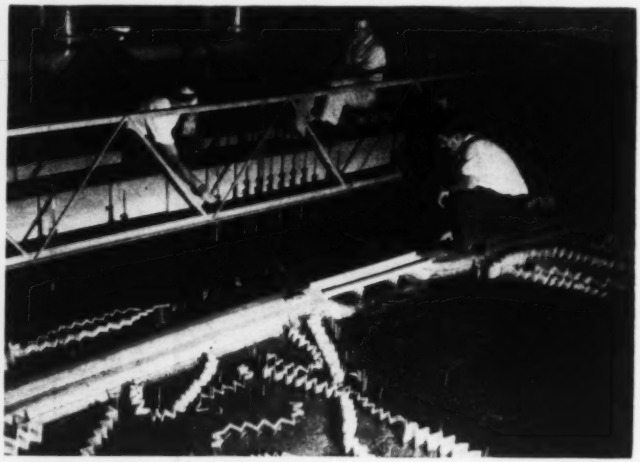
EDUCATION, RESEARCH



MODEL OF HIGHWAY BRIDGE over Wabash River flood plain built by University of Illinois engineers for their study of how to tame the eddy which threatened to drop the bridge into a 40-ft deep hole cut by the river. Zigzag wire represents underbrush growing on stream banks and underwater in flood time. Measuring water changes from the movable bridge are, left, Mulford Martin, junior civil engineer; center, Irby J. Hickenlooper, research associate, and right, Prof. John C. Guillou, in charge of the university's hydraulic engineering laboratory, who supervised the research.

Model bridge helps tame Wabash River eddy

By working with a model for nearly two years, engineers at the University of Illinois have learned how to tame rampaging waters in southern Illinois and to prevent the destruction of a bridge on a highway over the Wabash River flood plain to New Harmony, Ind.

The swirling river waters cut a hole 23 ft deeper than the bottom of the bridge piers and threatened to drop the bridge into the 40-ft deep hole. Dumping of hundreds of tons of rubble failed to check the river's rage.

Prof. John C. Guillou, in charge of the hydraulic engineering laboratory, with other university engineers, tackled the problem in cooperation with the Illinois state highway department. They constructed a large model of the locality and flowed water over it to study what was happening. Then they tested their suggestions.

The engineers learned that in flood time the Wabash River approaches the bridge from two directions, its normal channel and another opposite it around a wooded island. Under the bridge current had formed an eddy that cut the big hole beyond the bridge.

As their solution they recommended the construction of upstream dikes for 100 ft ahead of the bridge, directing water under the bridge opening, and to cut away the end of the island so that the stream can flow through under the bridge and not make an eddy.

This work will cost much less than a new bridge, they estimated.

Scientists study hail

At the University of Massachusetts in Amherst, scientists are producing man-made hail and thunderstorms by means of a machine built in the university's laboratories. During the past summer two hail storms in the Connecticut River Valley caused about $3,000,000 damage to the tobacco crop. That is why Prof. Herbert N. Stapelton of the engineering school, and Prof. Earle Cox and others took a hand and the machine they built spews out ice, water and thunder from its 10-hp motor at a velocity of between 80 and 90 mph. A 10-hp. mist sprayer was mounted on a 100-gal. water tank. A hopper was placed to top off the mist sprayer to allow the introduction of ice cubes and water to the air

(Continued on page 75)

7000 feet of CLOW (threaded) Cast Iron Pipe

...OVER 40 TONS USED IN THE CONSTRUCTION OF THIS MODERN CHURCH BUILDING

St. Rita High School Monastery recently erected in Chicago

ARCHITECTS and ENGINEERS: Maher & McGrew

PLUMBING CONTRACTOR: Jacob G. Weber Co.

Though only a moderately sized structure, four stories high, 7000 feet of Clow (threaded) Cast Iron Pipe were used for the downspout, waste and vent piping in this Chicago monastery. Clow pipe was cut, fitted and installed for these services because of its long-lasting, non-corrosive features.

Here's why the Architects specified Clow (threaded) Cast Iron Pipe:

"For economy and performance we specify Clow Cast Iron Pipe for all lines 3" and larger in size," said Mr. Harry Maher of Maher & McGrew. "By so doing we know we are serving the best interests of our clients."

Here's why the Plumbing Contractor chose Clow (threaded) Cast Iron Pipe:

"We chose Clow Cast Iron Pipe because of its long life and corrosion-proof qualities," said Mr. John J. Gallager, General Manager of the Jacob G. Weber Co. "The owners of the building wanted the finest pipe we could get—to last as long as the building itself. Naturally, that meant Clow Cast Iron Pipe. We know Clow Pipe will stand up. That's why we've used it to replace a lot of corroded installations of other kinds of piping on a good many jobs."

Clow (threaded) Cast Iron Pipe has same O. D. as wrought pipe, is available with plain or threaded ends, in 3, 4, 5, 6, 8 and 10" sizes in 18' random lengths. Also available with integral calking hub on one end (other end plain) in 18' random lengths in 4, 6 and 8" sizes.

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on the job, with ordinary tools of the piping trade.

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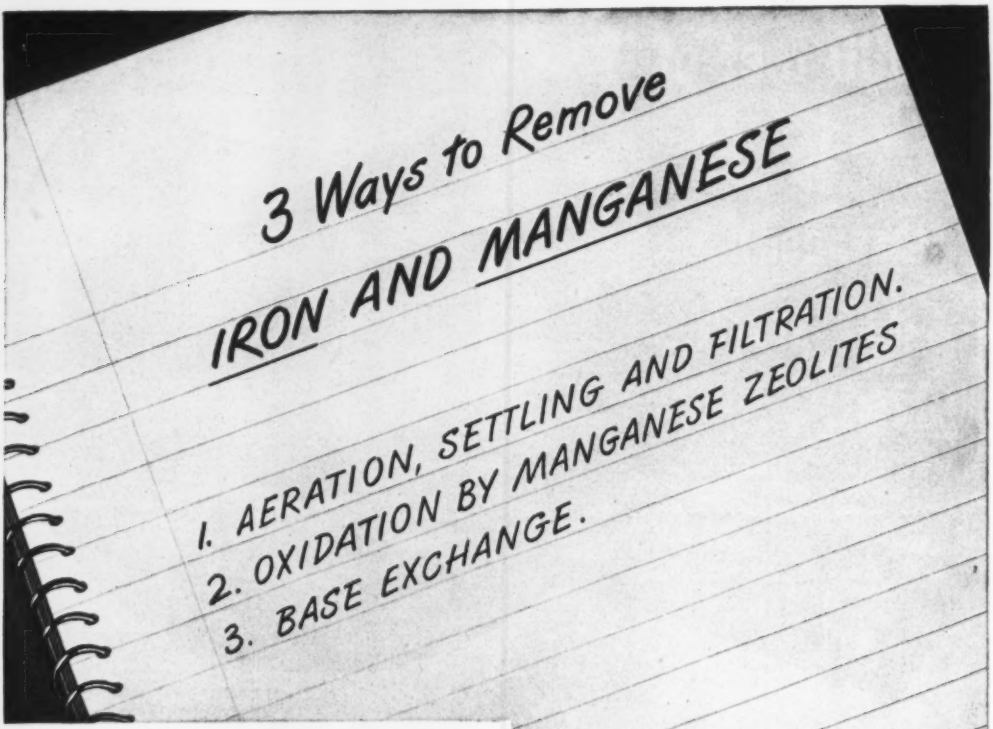
and their National Cast Iron Pipe Division, Birmingham, Alabama; subsidiaries Eddy Valve Co., Waterford, New York; Iowa Valve Co., Oskaloosa, Iowa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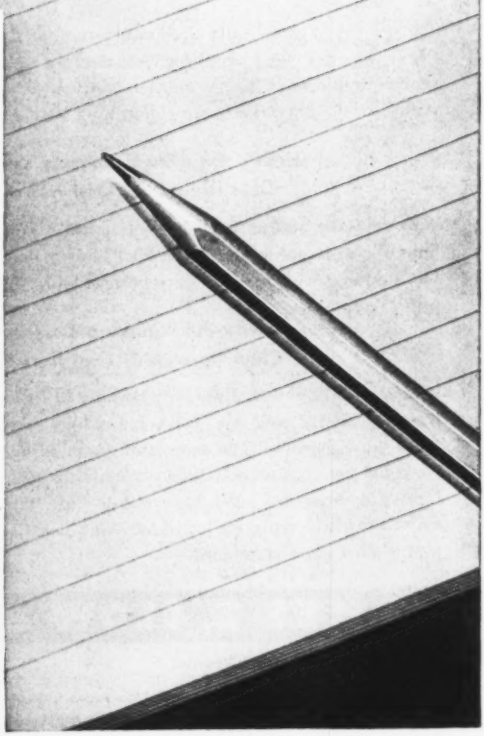

Education, research . . .

stream. Thus hail and thunder storms could be made to order and their effects studied.

Oregon concern solving paper mill waste problem

A step toward solving the problem of disposal of paper mill waste has been taken by the Crown-Willamette division of Crown Zellerbach Corp.

In an effort to eliminate one source of stream pollution, and in compliance with the Oregon State Sanitary Authority's order that paper mills cease dumping polluting agents into the Willamette River, the company is constructing a 19-acre settling basin adjacent to its plant in West Linn, Ore.

Into this basin, the company plans to pump sulphite waste liquor from the mill during low water periods, holding it there until the river level is high enough that release to the river will not lower the oxygen content to an extent harmful to fish life. Tests by Oregon State College and the state sanitary authority show that no pollution results when the river is running at flood.

The settling basin will have a capacity of 88 million gal of spent liquor from the paper mill, which produces an average of 200 tons of sulphite pulp daily. This storage will handle the entire waste liquor and "strong wash water" output of the big plant for a period of 220 days, according to engineers' estimates.

Stainless steel pipe, 8 in. in diameter, will be used to pump the spent liquor from the mill to the basin during low water periods. When the waste will not pollute the river, it will be dumped directly into the stream.

Plans do not call for lining the basin with impervious material to prevent saturation of the waste by the soil, as absorption would be beneficial to the project. Engineers report that because of the terrain, saturation of the soil will not cause any damage to adjacent property.

As the basin runs from 18 ft at its deepest point to only 1 ft at its lowest, considerable evaporation is expected to result, which will be all to the good.

Control of salt water studied in California

The state water resources board in California has authorized the expenditure of $450,000 for an experimental project near Manhattan Beach on the control of salt water intrusion into fresh water supplies. The sum is part

(Continued on page 76)

GET A FREE Tuffy® SLING AND PROVE TO YOURSELF IT'S MORE FLEXIBLE!

Yes, here's your chance to see for yourself the braided wire fabric of which TUFFY Slings are made. Tie it in knots, kink it—then see how easily a Tuffy sling can be straightened out without material damage.

Patent No. 2,454,417

HOW Tuffy® SLINGS ARE MADE

Scores of wires are stranded into nine parts, then machine woven into an interlaced wire fabric. This braided fabric gives extra safety and enduring strength. Even cutting one of the 9 parts does not result in stranding of the sling.

11 TYPES—PROOF TESTED FOR SAFETY There are 11 different types of Tuffy Slings, each one proof-tested to *twice* its safe working load. And the safe working load is plainly marked on metal tags on each sling. Also, Union Wire Rope engineers will help work out special sling problems. If you have your own rigging loft, Tuffy braided wire fabric is available by the reel.

FREE SAMPLE—MAIL COUPON

To show you the difference between TUFFY Braided Wire Slings and ordinary wire rope slings, we have made up a quantity of 3-foot slings. We want you to have one so that you can test it and prove to yourself that TUFFY Slings really are better. Mail the coupon below today for yours.

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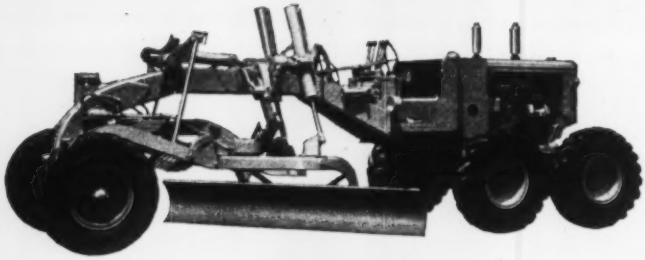
WHEN THE Blade WORKS RIGHT

WARCO® is the ONLY motor grader whose blade... entirely cab-controlled... attains all working positions. Other graders rely on manual adjustment to reach many positions. That's how WARCO cuts "dead-heading"... reduces manual adjustment down-time... increases profits.



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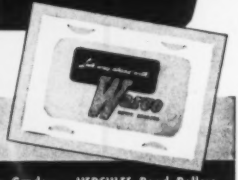

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BUCYRUS OHIO
• builders of WARCO Motor Graders — HERCULES Road Rollers

Education, research . . .

of $750,000 made available for research work by the California Legislature.

The work will be conducted under the direction of Harvey O. Banks, supervising hydraulic engineer in charge of water quality investigations for the state division of water resources.

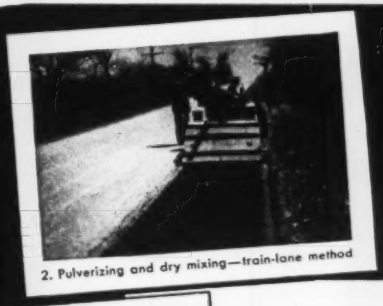
The $450,000 will be spent for the installation and one year's operation of a field experimental project to investigate the hydraulic feasibility of creating a pressure ridge in confined quarters by means of injection wells and the effectiveness of such a ridge in preventing sea water intrusion. Five injection wells are planned as well as a sufficient number of observation wells to yield the data necessary for complete and conclusive interpretation of the results.

The water resources board plans to allocate additional funds to the experiment if results of the first six months operation indicate the installation of five injection wells is not enough to yield conclusive results.

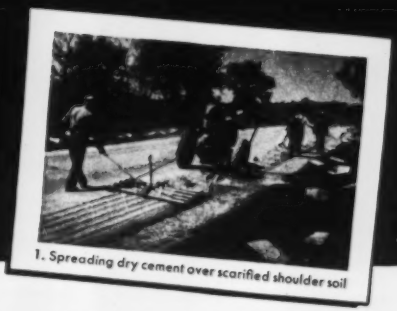
The board also approved the allocation of $30,000 for laboratory research work.

• **Building code administration**—Two studies looking to the improvement of building code administration are being started by Syracuse University under the research program of the Housing and Home Finance Agency, Administrator Raymond M. Foley has announced. One study involves an analysis of representative systems for administering municipal building codes. The other will develop a training program for local building officials. "It is too often assumed that the adoption of a building code assures that buildings constructed in a community will be safe and sanitary," Mr. Foley said. "That is not true. A building code is not only a document, and no matter how well drafted and current its contents, skilled administration and enforcement are essential to make it effective."

• **Engineer shortage**—With a national need for 30,000 engineering graduates every year, a shortage of 5,000 next year, 21,000 in 1953, and 18,000 in 1954 is to be anticipated, according to Morton O. Whithey, dean of the College of Engineering at the University of Wisconsin. Whithey, writing in a recent issue of The Wisconsin Engineer Magazine, based the estimates on curren enrollments and on figures which show a large demand for civil, chemical, electrical, mechanical, mining, and metallurgical engineers.



2. Pulverizing and dry mixing—train-lane method

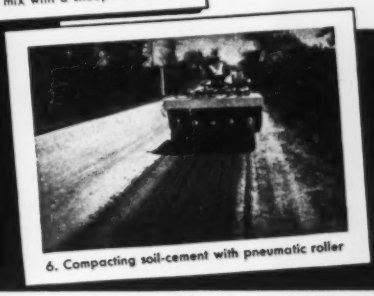


1. Spreading dry cement over scarified shoulder soil

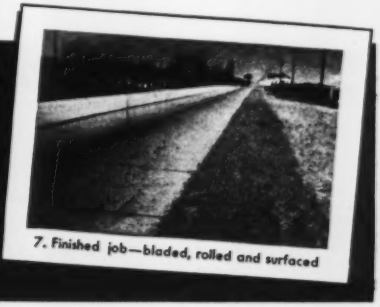
3. Applying water to soil and cement mixture

4. Wet mixing the ingredients

5. Compacting the mix with a sheepsfoot roller



6. Compacting soil-cement with pneumatic roller



7. Finished job—bladed, rolled and surfaced

Make old, narrow roads safer with low-cost *SOIL-CEMENT* shoulders

OLD, narrow pavements flanked by soft, rutted or gullied shoulders are hazardous. Yet they can be made safe—economically—by paving the shoulders with soil-cement,* which provides a firm extra width of all-weather pavement.

Soil-cement shoulders are stable the year around. They do not soften from freezing and thawing or wash away in rainy seasons. They prevent rutting just off the pavement, a major driving hazard. They protect pavement edges from damage by wheels, frost or erosion, thus eliminating expensive maintenance. They also prevent the growth of vegetation, which hides the condition of the shoulders from the motorist.

Paving shoulders with soil-cement makes narrow roads safe economically. Paving is fast and easy; needed machinery is readily available. Roadside soil constitutes about 85% of the required materials; usually only portland cement, water and surfacing material need be brought to the job.

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2 New Developments

that mean LOWER COST REINFORCED CONCRETE

1. New A. C. I. Building Code

2. New A305 Reinforcing Bars

Early this year, the American Concrete Institute revised its building code requirements to take advantage of the benefits made possible by the new A305 reinforcing bars. Under the new code standards, these bars increase allowable bond stresses, reduce lapping at splices, and practically eliminate hook anchorage. They provide even stronger reinforced concrete structures at lower cost. In order for *you* to share in these benefits, your local code must be revised to conform to the new A.C.I. standards.

CONCRETE REINFORCING STEEL INSTITUTE
38 S. Dearborn St., Chicago 3, Ill.

MEETINGS

Wakefield, Mass., Department of Public Works, has been elected a director of the Massachusetts Society of Professional Engineers. Roy E. Argersinger of the Stone & Webster Engineering Corporation is president. The Massachusetts group is affiliated with the National Society of Professional Engineers.

Boston, Mass., has been selected for the annual convention of the International Municipal Signal Association which will honor the 100th anniversary of the first fire alarm system in the world which originated in Boston in 1852. The affair will take place in Boston September, 1952, and about 500 delegates are expected to attend.

Clayton Speck of Sunnyside, Wash., has been elected president of the Washington State Good Roads Association, with Olaf Caskin of Seattle as chairman of the executive board, Russell Van Rooy of Seattle as secretary and Lew Shaw of Seattle as treasurer. Frank Barrett of Seattle, N. J. Schmitt of Port Angeles, A. R. Nieman of Vancouver, Wendell P. Brown of Pasco, Dan Gordon of Chelan and Leon Titus of Tacoma were named vice-presidents while the following were named to the board: Ofell Johnson and Rod Ryker, Seattle; Art Ganson, Winslow; Herb Hough, Blain; J. M. McCaw, Aberdeen; George Ruth, Longview; Roy J. Fletcher, Centralia; Don Colwell, Yakima; E. J. Miller, Prosser; E. H. Kidwell, Pasco; Gus Neiman, Spokane; Lloyd Millner, Carlton, and Louis Bovee, Cashmere.

At the annual convention of the maritime provinces branch of the American Water Works Association, held at Kentville, N. S., the following officers were elected; President, F. C. Wightman, Amherst, N. S.; vice-president, M. L. Gordon, Truro, N. S.; secretary, J. D. Kline, Halifax, N. S. W. R. Godfrey, St. John, N. B. is retiring president. J. L. McAvity, St. John, is representative of the branch on the Canadian section.

• **Engineers volunteer for defense**—More than 600 professional engineers in Seattle, Wash., have been enrolled as civil-defense volunteers under the engineering division of the Seattle Civil Defense Corps. The division, headed by City Engineer Ralph W. Finke, includes volunteers from 23 engineering organizations.

The board of directors, International Road Federation, has been increased to 16 members with the election of eight additional directors, B. C. Budd, chairman, announced today. Newly elected members are J. Andreoli, vice-president, General Tire and Rubber Export Co. W. C. Gulick, president, International R. F. Goodrich Corp. R. E. McCluskey, vice-president, R. G. Le Tourneau, Inc.; Fred Reich, manager, Lubrication Sales Division, California Texas Oil Ltd.; Fred Saldit, vice president, Harnischfeger Corporation; Edgar Smith, vice-president, General Motors Overseas Corp.; P. H. Swinchatt, assistant to the president, Shell Oil and C. B. Thomas, president, Chrysler Export Corp.

CALENDAR

American Society of Planning Officials, national conference, William Penn Hotel, Pittsburgh, Pa. Oct. 14-18.

Street Maintenance and Sanitation Officials, Ohio, Hotel Pic-Ohio, Youngstown, O., Oct. 18-19.

Engineers Council for Professional Development, Statler Hotel, Boston, Mass., Oct. 19-20.

National Council of State Boards of Engineering Examiners, Statler Hotel, Boston, Mass., Oct. 21-24.

Engineers' Society of Western Pennsylvania, water conference, William Penn Hotel, Pittsburgh, Pa., Oct. 22-24.

American Society of Civil Engineers, annual meeting, Statler Hotel, New York City, Oct. 22-25.

National Standardization Conference, Waldorf-Astoria Hotel, N. Y. City Oct. 22-24.

American Association of State Highway Officials, Fontenelle Hotel, Omaha, Neb., Oct. 23-26.

American Institute of Steel Construction, Inc., annual meeting, the Greenbrier, White Sulphur Springs, West Va., Oct. 22-25.

California section, American Water Works Association, Fairmount Hotel, San Francisco, Oct. 23-26.

Florida Sewage and Industrial Wastes Association and Florida section A.W.W.A. Princess Issena Hotel, Daytona Beach, Fla., Oct. 28-31.

Structural Clay Products Institute, Greenbrier Hotel, White Sulphur Springs, W. Va., Oct. 29-31.

American Concrete Institute, regional Sheraton Hotel, St. Louis, Mo., Oct. 30-31.

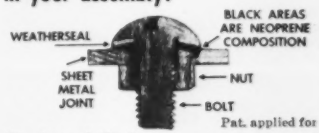
American Public Health Association, annual meeting Civic Auditorium, San Francisco, Calif., Oct. 29-Nov. 2.

Conference on Coastal Engineering, Rice Hotel, Houston, Tex., Nov. 7-10.

Conference on Atomic Installation in Buildings, Building Research Advisory Board, National Academy of Science auditorium, Washington, D. C., Nov. 27-28.

WEATHERSEAL

Two-Way-Squeeze Washers will make perfect, leak-proof joints in your assembly!



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Weatherseal Washers are one-piece, metal bonded to neoprene composition. The two-way squeeze completely seals the washer's outer edge as well as the fastener shank, making it a valuable, cost-saving item in these and other applications:

- **Sheet metal roofing and siding**
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- **Porcelain-to-metal assemblies**

Weatherseal increases fastener grip, insulates galvanic currents in unlike metals, aids against rattle.

TOPSEAL, the factory-assembled fastener and washer, saves time, reduces inventory. You specify or supply the fasteners. Write for a Weatherseal Washer sample, stating your sealing or fastening problem. Large stocks for quick shipment.

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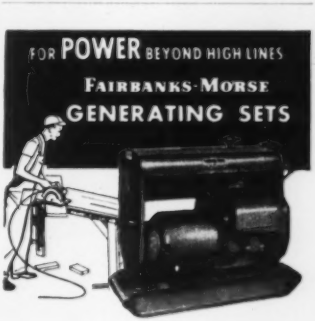

If you have a problem in power supply for a construction job; lighting an airfield or boat landing; power and light for a tourist court, summer camp or restaurant; lighting and heating country schools or churches; or for any other similar purpose, get the facts about dependable Fairbanks-Morse Generating Sets.

They are available in capacities from 600 to 35,000 watts, A.C. or D.C., and equipped with manual, remote or automatic starting devices. For details, see the Fairbanks-Morse dealer nearest you, or write Fairbanks, Morse & Co., Chicago 5, Ill.

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International Steel

When your steel building problem is out of the ordinary, then you'll find why so many builders and contractors depend on International Steel. The fabrication of steel at International is more than so many man-hours spent in following blueprints. Time and again customers have turned to International with "problem" jobs. By working together, such difficult steel fabrication jobs have been licked satisfactorily . . . economically . . . and on schedule. Out of this sort of teamwork have come steel structures built to withstand the stress of modern aircraft testing . . . doors developed to withstand hitherto unattained pressures . . . new compact steel framework for limited areas. International Steel craftsmen know how to work with steel . . . from the drawing board stage through satisfactory erection on the job. When you have difficult steel fabrication problems where "talking it over" may help — call in International Steel.

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STRUCTURAL STEEL
STEEL BUILDINGS
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OBITUARY

C. L. Best, 73, pioneer inventor and tractor builder died in San Francisco Sept. 22. One of the founders of Caterpillar Tractor Co., he was chairman of the board and member of the executive committee at the time of his death. It was in 1910 at Elmhurst, Calif., that he formed the C. L. Best Tractor Co., and began making gasoline wheel tractors. In 1913 his company entered the field of gasoline-powered track-type tractors. In 1925 his firm and the Halt Mfg. Co. were merged to form Caterpillar Tractor Co.

Walter T. Littlefield, 82, former building commissioner of Somerville, Mass., and for many years an architectural engineer at Boston, Mass., died at Somerville on Sept. 23. He was a graduate of the Massachusetts Institute of Technology.

Nelson Beaudet, 84, former chairman of the Gardner, Mass., board of public works, died in that city Sept. 24.

James McCullough, 40, civil engineer, of Denver, Colo., died there Sept. 11. He was a graduate of Georgia Tech.

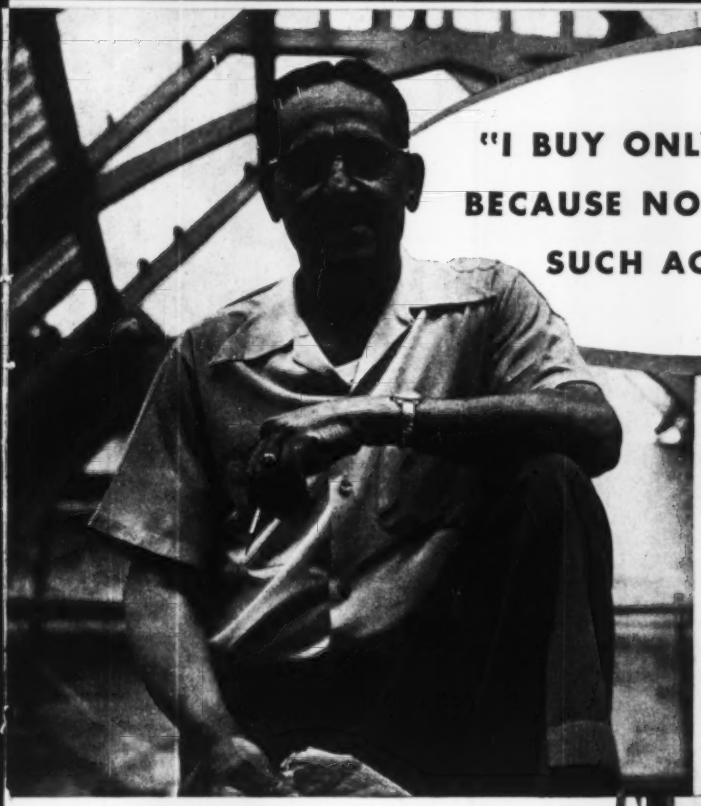
Otto A. Mueller, 54, chief engineer for the Ernst Construction Corporation, Buffalo, N. Y., died Sept. 21. Employed for 21 years by the Ernst organization, from 1930 to 1940 he was with the Ernst Iron Works and, after that, with the construction firm.

Comdr. Joseph R. Davis, 44, chief engineer for the Great Lakes district of the U. S. Coast Guard, died Sept. 24 at Baltimore, Md. He had been with the government service since his graduation from Rhode Island University in 1930. He entered the U. S. lighthouse service as a civil engineer and remained when the service was assumed by the Coast Guard.

In addition to Pacific duty in World War II, his service included 12 years at Staten Island, N. Y., and four years at Miami, Fla., before the war and service at Coast Guard headquarters in New York until last November when he was transferred to Cleveland.

Gustav Van Hemert Schneider, 66, died at San Francisco Sept. 13. A resident of Tucson, Ariz., he served as civil engineer with the Southern Pacific Co., from 1904 until his retirement in 1948. He had served as assistant to the president of the Southern Pacific lines in Mexico and designed many bridges for the SP in

(*Continued on page 85*)

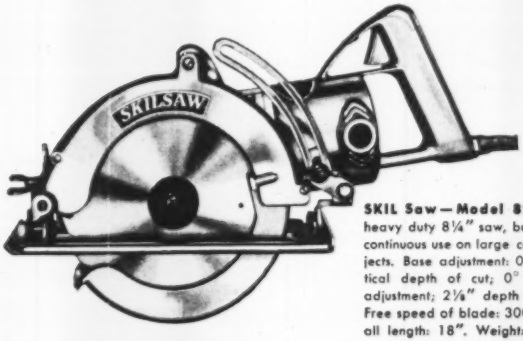


"I BUY ONLY SKIL SAWS BECAUSE NO OTHER SAW DOES SUCH ACCURATE WORK!"

says Mr. Arnold Guenther, owner of A. GUENTHER and SONS, Incorporated, West Allis, Wisconsin

This firm specializes in the construction of fine churches. Mr. Guenther chooses SKIL Saws exclusively for this exacting work. He says, "I buy only SKIL Saws because church construction, with its ornamental design, frequently calls for compound cuts. I've found that only with a SKIL Saw, where you can see the blade and the sawing guide while standing behind the saw in a comfortable position, can you do accurate work."

Larry Persch of the Guenther firm says, "With a SKIL Saw I can see what I'm doing." Persch is making a cut to fit this 2 x 4 over duct work in a window stool. Persch who has been a carpenter and a SKIL Saw user for 15 years said further, "Over 450,000 board feet of lumber have gone into this church and we've used only three SKIL Saws on this job. The adjustments are easy to make and we know that with our SKIL Saws we can make end cuts on roof boards with a 75% saving in time."



SKIL Saw—Model 825. Powerful, heavy duty 8¼" saw, built to withstand continuous use on large construction projects. Base adjustment: 0° to 2⅜" vertical depth of cut; 0° to 45° bevel adjustment; 2⅛" depth of cut at 45°. Free speed of blade: 3000 r.p.m. Overall length: 18". Weight: 17¼ pounds.

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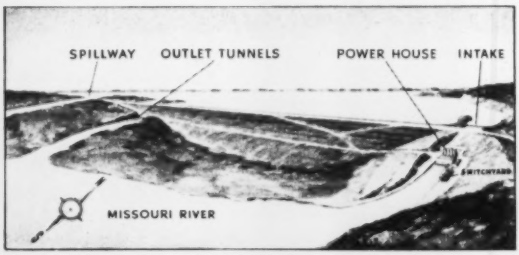
Big Red TD 24

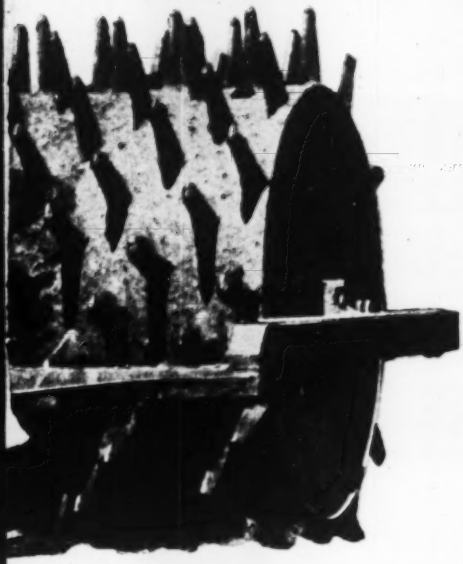
BREAKIN' SHALE ON THE BERM. TD-24 pulls a 60,000-lb. capacity spike-tooth roller, evening surface of uncompacted berms. Five TD-24s are literally "all over the place" on this big project's toughest jobs.



ARTIST'S CONCEPTION OF OAHE DAM at completion in 1959. Power works above will provide 420,000 kw with 6 generators, twice as much power as South Dakota produces at present. 78 million cubic yards of earth are involved.

BIG RED REALLY KEEPS THE LOADS MOVING—Whether it's pushing or pulling, TD-24's great power and speed enable it to move more pay dirt faster.

Rolls Out the Wrinkles on Oahe Dam



Five International TD-24s star on dam project, harnessing the "Big Muddy," creating a 250-mile lake and irrigating two million South Dakota acres.

Contractor's superintendents, dirt boss and skinners at the big Oahe Dam project on the Missouri River near Pierre, South Dakota—all will bend your ear about "Big Red."

Operator Troy Hood goes on record: "Cutting on a curve, TD-24's Planet Power steering keeps both tracks pulling so you keep all power working to do a faster job."

Here's another TD-24 skinner, Jack Rank: "Son-of-a-gun really has got the power. Much easier to handle than other tractors, easier to work, easier on me. I'm on it 10 hours a day, so I know."

Dirt Foreman Sam Crawford backs them up: "TD-24 can't be beat. We haven't found anyplace it won't go."

John P. Beck, general superintendent for subcontractor Campbell-Collins, has high praise for "Big Red": "We're well satisfied with our TD-24s. Their speed in reverse certainly is an advantage as no time is lost between pushing runs behind our ten scrapers."

There they are—solid reasons for TD-24 preference by the men who move the dirt.

Take their word for it. See your nearest International Industrial Distributor for the facts behind enthusiastic TD-24 performance reports making the rounds. Find out how he backs up the power he sells with full stock of parts, factory-trained mechanics, and the latest service equipment, to keep your equipment in the high output bracket.

INTERNATIONAL HARVESTER COMPANY, CHICAGO 1, ILLINOIS

"WE LIKE TD-24 POWER," says John P. Beck of Campbell-Collins (left). Looking on are F. A. Bleecker of Guy H. James Co., prime contractor; L. G. Leavitt, area engineer; and F. P. Evans, office engineer.

INTERNATIONAL HARVESTER

INTERNATIONAL

POWER THAT PAYS

VICTAULIC... Superior Piping for 27 Years

The Victaulic Method is the complete piping method. The name Victaulic stands for pioneered leadership in quick, dependable piping construction.

Here are the facts – just what the Victaulic Method is . . . why it's the EASIEST WAY TO MAKE ENDS MEET –

First – it's simple and fast – combines ease of application and ease of assembly.

Second – it's flexible and sure – can be used for irregular laying contours, yet it assures positive-locked, leak-proof joints even under extreme pressure, vacuum, or strain conditions.

Third – the name VICTAULIC represents a COMPLETE LINE of modern Full-Flow Elbows, Tees and other Fittings that provide unique versatility in a piping system.

Fourth – easy-to-use, portable Vic-Groover tools prepare pipe ends twice as fast and with half the effort of a conventional pipe threader.

Try the Victaulic Method on *your* next piping job – new construction, repairs, or alterations – you'll be sure to save time, work, and money!

Make that next job ALL VICTAULIC! Write today for Victaulic Catalog and Engineering Manual No. 44-8D

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27TH VICTAULIC YEAR

The easiest way to make ends meet
VICTAULIC
PIPE COUPLINGS AND FITTINGS

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Obituary . . .

southern Arizona and northern Mexico. In 1946 he supervised removal of a 2,000-ton SP office building in Phoenix. The building was set up at its new location only ¼ in. off specifications.

Clinton W. Kellam, 95, a former contractor of Newton, N. J., died at Pinehurst, N. C., Sept. 12.

Stewart S. Mullen, 61, building contractor of Seattle, Wash., died Sept. 17 at Fairbanks, Alaska, where he was beginning construction of an 11-story apartment. Born in Nova Scotia, he had lived in Seattle since 1906, and had been engaged in contracting more than 20 years.

Harvey R. Bedell, 81, retired engineer for the New York State Highway Department, died Sept. 17. He was with the department for 26 years before his retirement in 1933.

Theodore P. Krebs, 72, Columbus, Ohio, formerly a civil and map engineer in the Franklin County engineer's office, died Sept. 17.

Jacob N. Bick, 92, builder of the first electric interurban road in Ohio and for many years a prominent railroad contractor, died Sept. 16. He was a partner with N. P. Glann in the road contracting business (Bick & Glann), and later went into the railroad construction business for himself. After World War I until his retirement 15 years ago he was a street paving and sewer contractor.

Frederick E. Everett, 75, former state highway commissioner of New Hampshire, died in Boston, Mass., Sept. 18. He was a graduate of the Massachusetts Institute of Technology, former engineer in the park department, Cambridge, Mass., and from 1906 to 1949 was with the New Hampshire highway department, becoming commissioner in 1915. He was a past president of the American Society of Highway Officials and of the North Atlantic State Highway Officials Association, as well as of the New Hampshire Good Roads Association. In 1930 he was a delegate to the International Road Congress. In 1946 he received the George S. Bartlett Award of the American Society of Highway Officials, the American Road Builders Association and the National Research Council.

A. G. Wulff, 80, retired civil engineer, died at Fort Lauderdale, Fla., Sept. 20. Prior to going there 12 years ago, he served as an assistant city engineer in Cincinnati, Ohio.

(*Continued on page 86*)

Herman Nelson *Safe* Portable Heaters add weeks of "working weather"!

BAD weather ahead? That's the forecast! But cold, rain or snow won't put your construction schedule in low gear . . . if Herman Nelson heaters are on the job. Engineered for rugged, heavy duty service these Herman Nelson mobile heating units keep jobs moving through winter's coldest months. Quick-Clean-Safe *heat* is delivered where you want it . . . when you need it . . . providing efficient working temperatures for men, materials and machinery.

Experienced construction men know there's a big plus in putting Herman Nelson units on their jobs. Greater heat producing capacity—up to 450,000 BTU—also greater versatility and efficiency saves the original equipment cost again and again. They're safe, too! Exclusive "sealed flame" and forced air ventilation features of Herman Nelson units eliminate carbon monoxide, fumes and fire hazards.

For heat on your job—heat that is quick, clean, *safe* and economical—let us show you why smart construction people are buying Herman Nelson Portable Heaters as a money-making investment. For full information write to Dept. EN-10.

HERMAN NELSON DE LUXE I

Capacity 280,000-450,000 BTU/hr.
Completely automatic, including temperature control.
Fresh air delivery 2,000-2,350 c/m.
Electric motor powered.
Other models available—with gas or electric power—and capacities from 125,000 to 385,000 BTU/hr.

AAF herman nelson

HERMAN NELSON

Division of **AMERICAN AIR FILTER COMPANY, INC.**

MOLINE, ILLINOIS

Because of the hardness and other desirable characteristics of these alloys, they provide high resistance to all types of wear – abrasion . . . impact . . . heat . . . corrosion. One application often adds 2 to 25 times longer service life to *worn or new* parts . . . big dividends in savings of "down-time" and replacements.

There is an Airco alloy available for oxyacetylene flame or electric arc application to meet all types of wear conditions.

1. *Severe abrasion and medium impact*
2. *Shattering impact and abrasion*
3. *Severe impact and abrasion*
4. *Sliding abrasion and impact*
5. *Extreme earth abrasion*
6. *Corrosion and heat*

Constant research is developing new alloys to meet special wear problems as they occur.

If you have parts or tools subject to any type of wear, it will pay you to investigate the savings you can make in maintenance and replacement costs by using Airco Hardfacing Alloys.

For further information about Airco's complete line of "wear-resistant" alloys, write your nearest Airco office or Authorized Dealer for a free copy of the Hardfacing Alloys Catalog.

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Obituary . . .

John B. Klunk, 81, Toledo, Ohio, retired civil engineer, formerly in charge of city paving in Toledo, and later general manager of the Continental Bitumen Co., died Sept. 24.

Murray C. Hendry, retired two months ago after 30 years' service as a hydraulic engineer with the Hydro-Electric Power Commission of Ontario, died Sept. 21 at his home in Toronto. Responsible for early surveys of the St. Lawrence River, Mr. Hendry was keenly interested in the seaway project. He was connected with Niagara Power development in his earlier days and was later active in survey work making studies of Manitoba and Alberta rivers.

John J. McCarthy, 78, died at Montreal Sept. 21. A native of Elizabeth, N. J., he went to Canada in 1910 and Supervised Construction of many hydroelectric plants including those on the Gatineau and St. Maurice Rivers in Quebec.

Fred E. Hale, 65, principal engineer in charge of structural design for Southern Services Inc., Birmingham, Ala. died recently.

R. Stuart Royer, 68, head of R. Stuart Royer and Associates, consulting engineers, Richmond, Va., died Sept. 21. He was a graduate of Virginia Polytechnic Institute.

Harry W. Troutman, 78, former city engineer of Logansport, Ind., and of Bellingham, Wash., died in Seattle, Wash., Sept. 22.

Louis H. Schwarzenberg, 65, president of Christian, Schwarzenberg & Gaede Company, architectural engineers who have designed and supervised construction of many large industrial plants in Cleveland, Ohio, and vicinity, died Sept. 20. He was graduated from Case School of Applied Science in 1910. He was associated with Wilbur Watson in engineering work for several years prior to establishment of his firm in 1913.

Wm. C. Donaldson, 77, former city engineer of Shelbyville, Ky., died Sept. 26.

Jacob A. Blanton, 63, with U. S. Engineers for a number of years and later with Georgia Highway Department in Brunswick, Ga., died Sept. 25 in Atlanta.

George D. Ramsay, 53, recently appointed city engineer of South Pasadena, Calif., died Sept. 8.

No matter how you say it

It Comes Out the Same

Last Year – This Year – Next Year

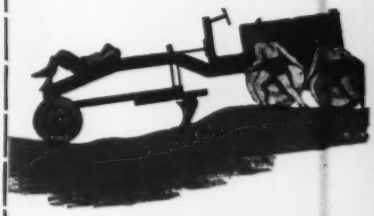
in 1940 we said

A motor grader without power on the front wheels is like a horse with roller skates on his front feet.

in 1945 we said

It's not in the cards for a grader with rear drive to equal the performance of one with All-Wheel Drive.

in 1950 we said



Don't handicap your horsepower! No grader with a dead front end can possibly deliver maximum power-at-the-blade.

No two ways about it! **Austin-Western's exclusive All-Wheel Drive goes more places . . . does more things . . . moves more material, farther and faster.**

AUSTIN-WESTERN COMPANY, AURORA, ILLINOIS, U. S. A., Subsidiary of Baldwin-Lima-Hamilton Corporation

Austin-Western

BALDWIN BLH LIMA-HAMILTON

SAUERMAN
Crescent SCRAPER

CRESCENT Scraper buckets are built in five types and fifteen sizes. Pictured above is a 3 cu. yd. size handling heavy excavating.

On thousands of earthmoving jobs, Sauerman Scraper machines equipped with the unique Crescent bottomless bucket, are cutting costs in digging, hauling and dumping almost every kind of material.

A Crescent bucket penetrates tough materials with ease, gets a full load quickly, hauls this load at speed of 400 to 600 f.p.m.—all with economical use of power.

Write for illustrated catalog.

SAUERMAN BROS., INC.
532 S. Clinton St. Chicago 7, Ill.

TRI-LOK
safety steps

"A STRONG STEP TO SAFETY"

Each Tri-Lok step consists of a panel of Rectangular, Diagonal, or U-type Tri-Lok flooring in any desired width, length, depth, and bar spacing.

SAFE—checker plate nosing bars make each step stand out clearly. Abrasive edging also available.

CLEAN—Clogless, rivetless Tri-Lok joint prevents accumulation of dirt, moisture, rust.

STRONG—added strength provided at maximum load contact by shape and rigidity of nosing bar.

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LABOR

WSB feels way on disputes handling

Some of the important ground rules for handling labor and industrial disputes involving national defense are being laid down now by the Wage Stabilization Board. Employers and unions are both watching carefully—trying to find a pattern such as existed during World War II.

The ground rules are sketchy up to now—because the WSB has received only a handful of cases. WSB officials insist, too, that they are playing by ear for the moment. But, here are some of the rules and procedures that have been pretty well decided upon through cases handled:

1. WSB will brush off any dispute that doesn't have a major impact on the defense effort.

2. Neither the President nor WSB will consider a dispute that does not seriously affect national defense (Truman put his executive order giving WSB fact-finding jurisdiction into effect for the first time only last week, in the Utah Copper shutdown).

3. Neither the President nor WSB will look at a case in which federal conciliation has not been fully tried.

4. No case will go to WSB unless both sides agree to a strike truce and resume production.

• **Firm base**—These rules are firm enough—in cases where the President steps in. But before he does step in, he will insist that all tests be met. And, as to No. 3, he will invoke Taft-Hartley injunction powers if the strike is not ended. Of course, the same rules apply in cases where both sides in a dispute voluntarily seek WSB assistance in reaching a settlement.

Unlike the War Labor Board in World War II, WSB has no powers of compulsion. But of course, "recommendations" of a government body acting for the President very often have the effect of binding decisions.

• **Tripartite**—All members of WSB are pretty thoroughly sold on the idea of tripartite (public, industry, labor) handling of disputes, although in some special cases, the board will use an all-public board.

For the most part, special panels—rather than WSB members themselves—will be used, because WSB members just can't spare the time consumed in hearings. But in major policy-settling disputes (like coal and steel) you can expect the WSB members themselves to sit.

OK pay hikes for white-collar workers

Businessmen now can get a pretty good idea of what they can pay white-collar employees, from top executives down to professional, technical and administrative help—without running afoul of the stabilization law.

Some rules have been laid down by the Salary Stabilization Board—which controls salaries of all persons who are paid a salary, do not have a union and are not covered by the federal wage-hour law.

• **Here's how**—First, if you haven't already done so, you can pay 10% above what you were paying in January, 1950—the "catch up" formula.

Second, if you dished out a profit-sharing, Christmas or some kind of year-end bonus last year, you can do it again—if you don't increase the payment.

If you have an approved escalator adjustment plan tied to cost of living (as General Motors has) you can continue to use it.

And (said SSB only last week) you can keep on making the type of salary adjustment most common in the executive and white-collar groups—the individual salary hike based on merit or length of service.

• **Without approval**—The regulation concerning merit or length-of-service hikes (SSB Reg. 3) is permissive, and doesn't require prior government approval. It does require that you keep records for three years, for possible future inspection.

In figuring these increases, there are three "don'ts" to be remembered:

1. The average of all merit increases in any calendar year may not exceed 6% of the payroll of the group of employees involved,

2. Where salary ranges are used, no employee's salary may pierce the range ceiling: In other words, the man at the top of the range is stuck unless he is promoted to a better job,

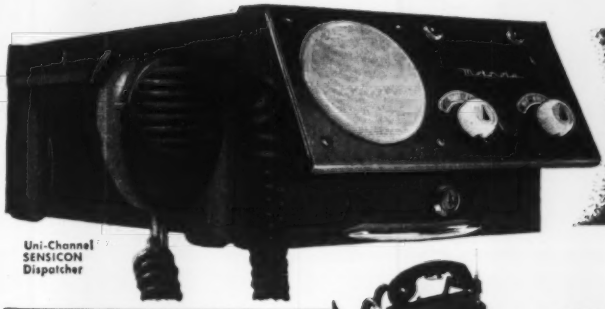
3. Where there are no salary ranges (and thus no top to serve as a ceiling) no employee may get more than 10% in merit increases in a year.

See small chance for probe into H-bomb labor

Washington observers last week thought there was small chance that Congress would authorize any investigation (at least at the current session)

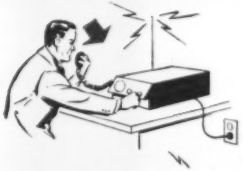
(*Continued on page 90*)

Simplified



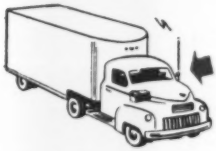
HANDIE-TALKIE* Portable

construction and maintenance tool



Set it on your desk, plug it into a socket, connect antenna, and you're in business with instant communication to all your mobile units.

... and a similar Uni-Channel dispatcher can be mounted in any mobile unit—matched pairs of "Handie-Talkies"* thrown into the action for the "foot soldiers" of Industry and Civil Defense.

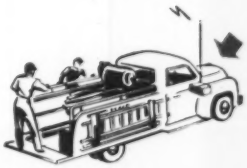


KEEPS ALL YOUR MEN IN CONSTANT CONTACT

... *Simplified Motorola Systems* offer you top performance of the marvelous Sensicon Circuit with Permakay for permanent selectivity and 7 other exclusive features that keep Motorola out in front as a better buy and sounder investment!

You need 2-way Radio for better communication. You need Motorola for more *Reliability*!

*Trade Mark of Motorola



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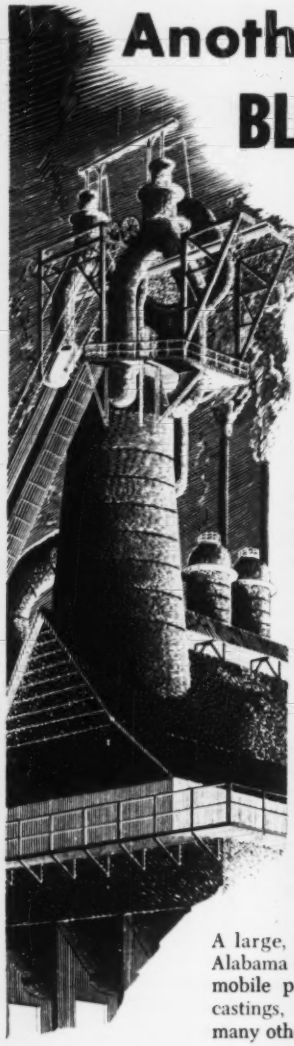
Over 20 Years SPECIALISTS IN MOBILE RADIO

MOTOROLA INC: COMMUNICATIONS AND ELECTRONICS DIVISION
4545 AUGUSTA BOULEVARD, CHICAGO 51, ILLINOIS
ROGERS MAJESTIC ELECTRONICS, LTD., TORONTO, CANADA

Another Merchant BLAST FURNACE

Will Soon Light Birmingham's Night Skies



Woodward Iron Company—one of the nation's biggest independent merchant iron producers—now has in progress the largest capital improvement program in the company's long history. Woodward's record-breaking expansion program includes construction of a new and modern blast furnace. Operation is expected to begin in the Fall of 1951.

Announcing the company's new construction program, President B. C. Colcord said:

"Prior to 1900, the bulk of merchant iron produced in Alabama was sold north of the Ohio River. Today over 95% is consumed by Southern foundries. We need additional capacity at our plant because of Alabama's rapidly accelerating industrial development.

"In the next year or two we are confident that many more plants using grey iron castings will come to Alabama."

A large, ready, nearby market now exists in Alabama for such finished iron products as automobile parts, bathtubs, boilers, pillow blocks, castings, stoves, electric equipment, gears and many others.

• • • • • •

The Committee of 100 or any of the undersigned members of the Executive Committee will welcome the opportunity to give you confidential and specific data regarding the advantages of the Birmingham district for your plant, office or warehouse.

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Labor . . .

of charges of labor abuses in H-Bomb construction work brought by Rep. W. M. Wheeler of Georgia (ENR Oct. 4, p. 25).

Wheeler, who said he and an aide donned overalls and wandered about the Savannah River H-Bomb site ostensibly in search of work, charged that he was told he would have to pay a fee of $108 to a union in order to get a work permit for the job; and also charged great waste of manpower and lax security regulations.

But Congressional leaders—already heavily preoccupied with a number of other investigations, apparently weren't planning to authorize any more probes at this session, observers said.

• **Other facets**—Meanwhile, the National Labor Relations Board was considering findings of two trial examiners that unions forced contractors to observe closed-shop conditions in construction work.

One of the cases was at the Cambria Range Station project near Lake City, Tenn. (a secret Corps of Engineers project). The trial examiner reported that the AFL teamsters union there violated the closed-shop ban by forcing the contractor to fire a non-union trucker and hire another sent by the union.

The other concerned a highway job at Eugene, Ore., where an examiner upheld charges of illegal closed shop practices filed by a carpenter against his union, which he said would not issue him a "work order"—thus denying him a job.

• **In again, out again**—While Congress debated investigating labor practices in general, the in-again-out-again construction labor forces at the AEC's huge Paducah, Ky., development were going through another series of gyrations.

And in Washington, the AFL's Building Trades Department offered to help work out a no-strike policy with the AEC on all AEC work—including the projects at Paducah and Dana, Ind.

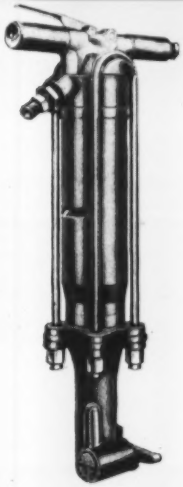
Labor briefs . . .

• **One-day strike**—A strike of 400 laborers working on more than $75 million in building construction near Worcester, Mass., lasted only one day. The workers accepted an offer of 10 cents an hour pay increase, time and a half between 7 and 8 a.m., and other benefits.

• **Limitations**—Another voice of protest against federal regulations cutting

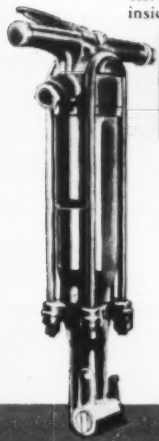
(*Continued on page 92*)

K ...is for the Knockout power in JOY PAVING BREAKERS



K-89... New Super heavyweight

There's real knockout power in this 90 lb. super breaker. The K-89 is designed to speed up demolition of those extra tough-and-heavy reinforced concrete sections, etc. Like all Joy SILVER STREAK Paving Breakers, the K-89 is cadmium-plated inside and out, which prevents rusting, eliminates scoring and aids lubrication.

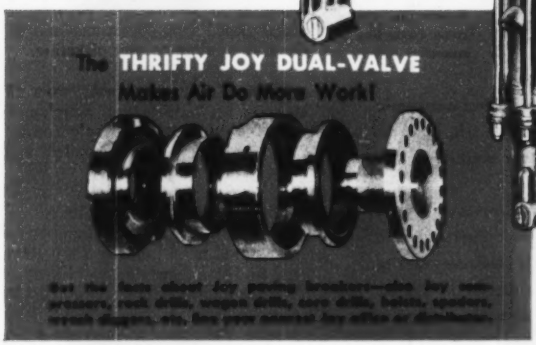


K-81... heavyweight

Handles tough demolition jobs economically and efficiently—breaks more concrete because it strikes more and heavier blows, and because it's easier to hold. Outstanding features of the K-81 include the exclusive Joy "Dual Valve," flat-sided cylinder for easy holding against operator's leg, replaceable chuck bushings, "U" type side rods and rugged cam-type retainer.

K-61... medium weight

Specially suited for thin-section concrete and other light demolition jobs—hard-hitting and easy-handling like the K-81, but lighter in weight. Many of the parts, such as the chuck housing, chuck bushing and throttle, will fit both the K-61 and K-81—a considerable saving in repair parts stock.



K-31 ...lightweight

Only 30 lbs.—a powerful, easy-handling little breaker that's ideal for light demolition and all work where the operator must support the entire weight of the tool, or where footing is not solid, as on scaffolds.

Write for Bulletins, or

Consult a Joy Engineer

100 YEARS OF ENGINEERING LEADERSHIP

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You name the job....

CARVER has the PUMP

Carver Self-Priming Pump available in sizes from 4,000 to 240,000 GPH. Also Diaphragm Pumps up to 6,000 GPH. Ask for Bulletin No. 110 Carver Pump Co., Muscatine, Iowa.

Carver builds a complete line of Self-Priming Centrifugal Pumps from 4,000 to 240,000 G. P. H. They have the reserve power and stamina for outstanding dependable performance throughout long life on all kinds of construction work.

Put these Carver Pumps on any job you have. You'll be amazed at their lightning fast automatic prime, high suction lift, capacity to handle more water, faster, farther, easier.

No matter how tough the assignment Carver Pumps do the job thoroughly because they're designed right. Order the Carver Pumps you need *today* — they're your best buy for better performance.

CARVER PUMPS Muscatine Iowa

Labor . . .

down commercial and residential construction in metropolitan areas rose last week when N. Y. State Housing Commissioner Herman T. Stichman said: Construction employment in the New York City area has dropped by 10,000 (below last year); urban private dwelling construction for the first eight months of the year fell more than 30,000 units.

• **Ohio workers get raises**—Building industry workers in Columbiana County (East Liverpool,) Ohio, have been granted a 14½-cent an hour pay increase, bringing wages up to $1.58 an hour for laborers; and $1.78 an hour for bricklayer, mason and tile setter helpers.

• **Enforcement**—The Wage Stabilization Board has named enforcement commissions for ten of its 14 regions, to hear cases of violations of the board's regulations as presented by attorneys. Regional commissions were named for: Boston, New York, Richmond, Atlanta, Cleveland, Chicago, Detroit, Denver, Minneapolis and San Francisco.

• **Picketing is picketing**—The National Labor Relations Board has rejected claims of the AFL Building Trades Council of Medford, Mass., that picket lines were thrown around a local lumber company "only to publicize the company's wages as too low." What the building trades were really trying to do, said NLRB, was enforce illegal closed shop conditions—and ordered the unions to quit picketing.

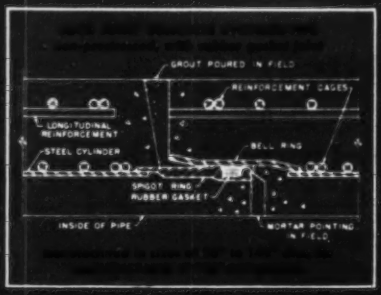
• **Resume Akron work**—A two-week strike of truck drivers and warehousemen against building supply companies in Akron, Ohio, has ended, and construction work resumed.

• **Michigan grants raises**—The Michigan State Civil Service Commission has granted raises totalling $400,000 a year to 532 engineering employees of the state highway department and 136 others in other state departments. The increase is designed to meet rising living costs.

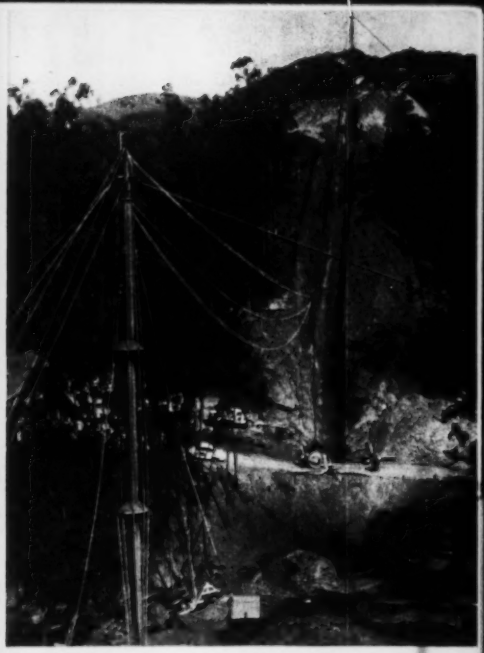
• **Kentucky road workers organize**—William Curlin, Kentucky State Highway Commisisoner, said department employees in "several" districts have received charters from either AFL or UMW unions to organize local units.

• **Masons get raise**—Some 1,200 bricklayers and stone masons in the Minneapolis-St. Paul area have been granted a 25 cent an hour pay increase, to bring their scale to $2.90 hourly.

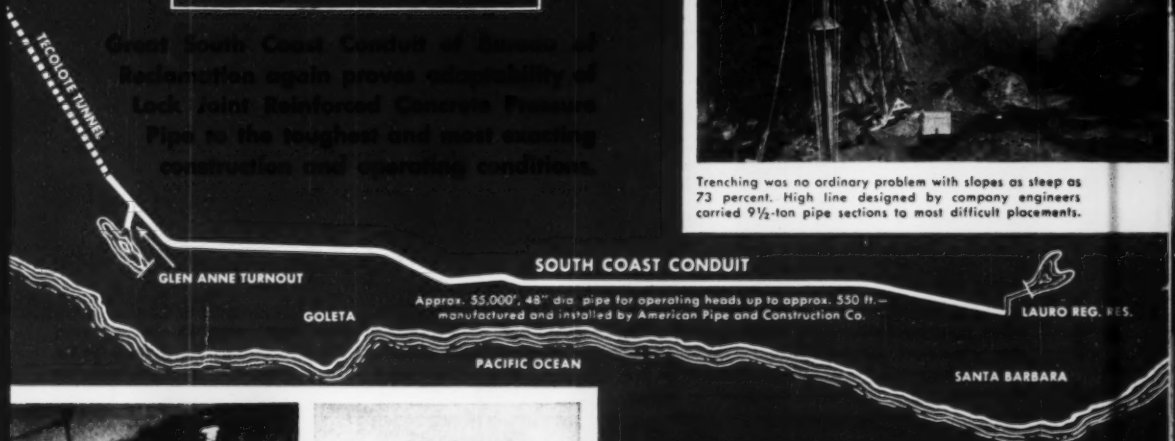
Rough, Tough and Rugged!



Great South Coast Conduit of Bureau of Reclamation again proves adaptability of Lock Joint Reinforced Concrete Pressure Pipe to the toughest and most exacting construction and operating conditions.



Trenching was no ordinary problem with slopes as steep as 73 percent. High line designed by company engineers carried 9½-ton pipe sections to most difficult placements.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GLEN ANNE TURNOUT
SOUTH COAST CONDUIT
Approx. 55,000', 48" dia. pipe for operating heads up to approx. 550 ft.—manufactured and installed by American Pipe and Construction Co.
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1. Pipe laying was simplified to the maximum extent possible by use of Lock Joint Rubber Gasket Joints.

2. This 80 ft. deep cut was backfilled to a depth of 20 feet over the pipe. Lock Joint Pressure Pipe will sustain enormous external loads.

3. Entire line was engineered to go together piece by piece, including all fittings and specials, a characteristic advantage of Lock Joint Pressure Pipe.

Few, if any, main water supply lines have presented more difficult construction problems than the South Coast Conduit of the Cachuma Water Project. Spanning the mountains and valleys of the precipitous terrain between Tecolote Tunnel and the Santa Barbara area, the line was considered one of the toughest projects of this kind since the construction of the San Diego Aqueduct, which also used Lock Joint Reinforced Concrete Pressure Pipe. Now nearly completed, modern engineering and the superior qualities of Lock Joint Concrete Cylinder Pipe have helped make it practicable. Illustrations indicate some of the ways this versatile pipe met the needs of this rough, tough, rugged job.

This line is a brilliant example of permanent reinforced concrete pipe line construction. It will serve the Santa Barbara area for generations at peak performance and minimum maintenance expense. The same advantages are available to you for your project—advantages that mean reductions in the cost of delivered water.

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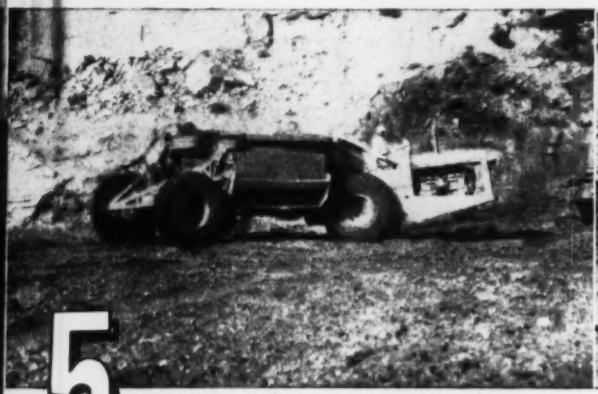
New 18-yd., 18-ton "C" gives you:

1 **FASTER LOADING** — Short, wide 9'x11' top opening requires minimum movement, minimum time to "top out" under belt loader. Shovel or dragline operator has easy target, low 8'9" loading height that speeds swing, reduces spillage.

2 **LESS JOCKEYING IN TIGHT QUARTERS** — 90° turn within 15'8" radius, together with positive power steer, get 186 h.p. Tournahopper to and from loader in a hurry. Also gives fast maneuvering on winding pit roads, along narrow levee tops.



5 **FAST TURNS OFF FILL** — 25" clearance (with gates open) and 15'8" turn radius permit fast dump and quick turn over windrows even when turning down steep side slopes. You can also back up and swing 90° to clear up to 42" boulders.

6 **FAST DUMPING — NO GATE DAMAGE** — Clamshell-type gate action clears load, eliminates gate damage when dumping rock. Independent electric power opening allows rig to stop over hopper, dump without having to be in motion.

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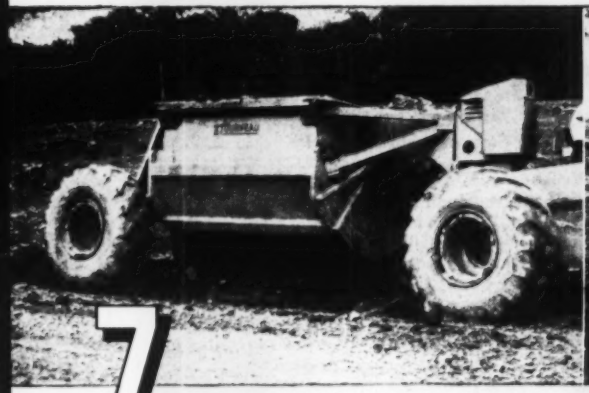
C Tournahopper 18-ton trailing unit can be interchanged with 18-ton Rear-Dump, 18-ton Scraper, flatbed or crane. Tournahoppers are also available in 35 and 50-ton models, may be interchanged with similar-sized scrapers, rear-dumps.

3 **KEEPS GOING IN SOFT FOOTING** — Power-proportioning differential, 5½ h.p. per ton of gross weight, and flotation of 21.00 x 25 low-pressure tires help rig go through spongy, wet going that frequently stops conventional bottom-dumps.

4 **SAFETY PLUS, EVERYWHERE** — With 4-wheel, multiple-disc air brakes (3763 sq. in., total braking surface), and instant-acting electric controls, operator can drive loaded Tournahopper up and down steep grades with complete safety.



7 **NO HAUL-BACK OF STICKY MATERIAL**—Gates swing aside and up across full width of bottom, wipe clean, eliminate haul-back of gummed-in material. Whatever can be loaded in the big top opening dumps clean.

8 **OPERATOR COMFORT — MORE PRODUCTION** — Fingertip electric controls, foam-rubber seat, full visibility lessen operator fatigue. Low-pressure tires cushion load and road shocks, help operator work fast, all day long!

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Please send complete information on:

- ☐ bottom-dump Tournahoppers
  - ☐ 18-ton ☐ 35-ton ☐ 50-ton
- ☐ rear-dump Tournarockers
  - ☐ 9-ton ☐ 18-ton ☐ 35 or 50-ton
- ☐ Tournapulls
  - ☐ 7-yd. ☐ 14-yd. ☐ 27½ or 44½-yd.

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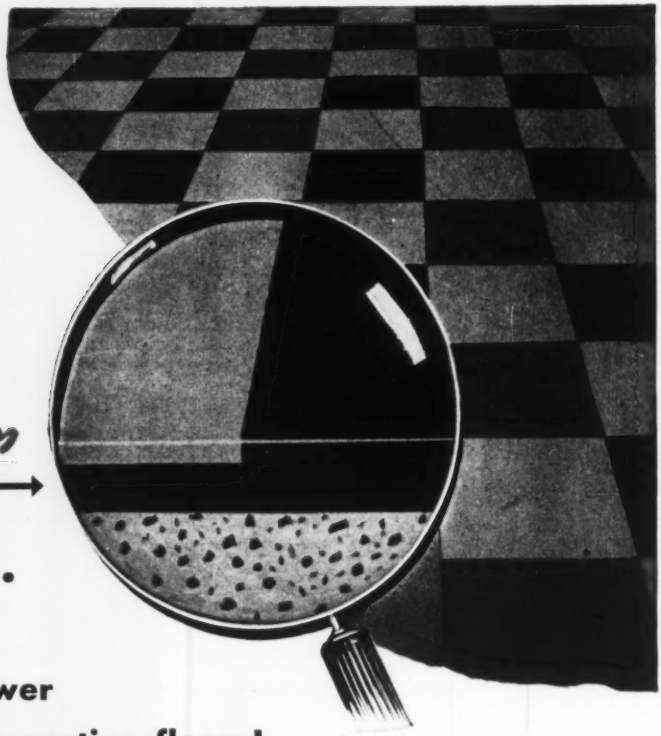

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CONSTRUCTION BUSINESS

Ten year construction outlook reported

By 1960, the value of new construction should reach $33 billion, about 20% higher than in 1950, the McGraw-Hill Economics Department predicted this week.

Factors which have promoted a construction boom since 1945—accumulated needs, population growth and rising national income—promise to keep construction at a high and increasing level after the end of present emergency restrictions, the Economics Department said.

At some time before 1960, construction activity may decline for a year or two as backlog needs diminish in particular fields, but it is unlikely that the decline will be severe enough or prolonged enough to alter the major growth trend.

The strongest growth trend to date has been in housing. Over the next ten years, the increase in housing will be considerably less, according to the economists. But it will remain the largest segment of total construction activity. And in the 1960's—when the postwar population increase shows up in a greatly increased number of marriages—housing needs will again increase sharply, it was said.

• **Community facilities**—Largest increase in construction activity in the next ten years will be in community facilities—stores, schools, hospitals, water and sewage facilities, streets and highways—to serve the record number of new homes put up since the war.

Public construction will increase more than private. This is because private construction expenditures are concentrated most heavily on housing, while community facilities are largely in the public field.

Business expenditures on new construction will probably not show such a pronounced rise after expenditures connected with defense mobilization are completed.

This is particularly true of industrial and utility construction. Commercial buildings—stores, offices, warehouses and service establishments—promise to show substantial growth.

• **Larger share**—Construction of buildings (homes, schools, factories, stores, etc.) will probably remain a much larger share of total construction—measured in terms of value—than outdoor construction, such as dams or highways, the Economics Department said.

From the manufacturers' viewpoint, the strongest growth trend in construction materials sales has also been in materials going into buildings (structures).

This will be modified somewhat during the next ten years, as the housing boom levels off, but annual expenditures on materials for new buildings of all kinds still promise to increase faster than those on public works.

Companies 'sit tight' on structurals

The country will have to worry along as best it can with the present output of structural steel—1.3 million tons per quarter, it appeared in Washington this week.

In the event of war or total mobilization, as things now stand, structural worries would become much more intense. The situation then could be met only by shutting off all—or nearly all—civilian construction.

There are no activated plans for increasing structural rolling capacity. While boosting ingot capacity by 20%, the steel companies are sitting tight and are not expanding existing facilities for rolling structural shapes.

• **Some help**—But there is a chance for a modest increase in output through more intensive use of present facilities. Wallace B. Quail, director of the National Production Authority's Iron and Steel Division, thinks it might be possible to squeeze as much as 10% more out of existing rolling mills—provided the mills can be fed blooms or ingots as fast as they can consume them.

There's the rub. Rolling mills for structural shapes are normally integrated units of big steel plants. They get their steel from the same furnaces that supply the plate, strip and rod mills. In a time of pinch, like the present, the hot blooms and ingots have to be spread around where authorized Controlled Materials Plan orders require.

• **No diversion**—Plate is, if anything, shorter than structural shapes. There are structural rolling mills that could produce a larger tonnage if the demands on adjacent plate mills weren't so large. But, as Mr. Quail points out, NPA cannot divert blooms to a structural mill when that would mean short-changing a 160-inch plate mill. Wide plate is even more urgently needed than shapes.

(*Continued on page 98*)

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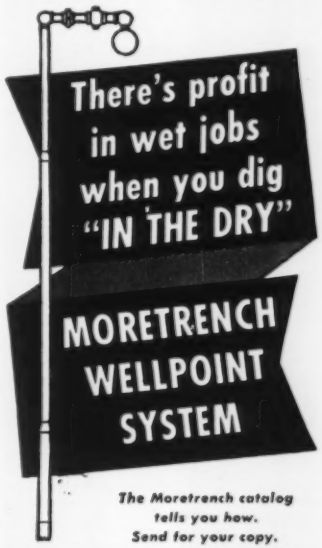

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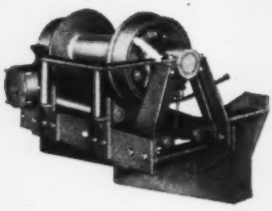

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Construction business . . .

So-called "conversion" steel could help out in this situation. But conversion steel has almost disappeared from the market.

It is an outgrowth of the steel-short market of the last five years. Many consumers were willing to buy unfinished steel from one mill and pay the cost of transporting it around the country to other mills in order to get the finished steel product they wanted. Today, they can't find raw steel to buy.

NPA doesn't want to suppress conversion steel. Rather, it would like to encourage a reasonable tonnage. The agency is working on a conversion steel order.

If a steel mill can produce an excess of ingots or blooms, the National Production Authority would like to see a consumer pick up the raw steel and take it elsewhere for the finishing operations.

• **More than enough?**—Mobilization agencies are studying the need for additional structural capacity. But steel companies feel sure their present facilities will be able to turn out more than the country can consume in 1953 or soon after.

Even mobilization officials deprecate the possibilities. Mr. Quail, for example, points out that a structural rolling mill is a costly investment that would take at least two years to build. No steel company would start one, he said, unless it could foresee a 25-year market for the product. Right now, that future market is not in the cards, they say.

New construction funds sought in bond deals

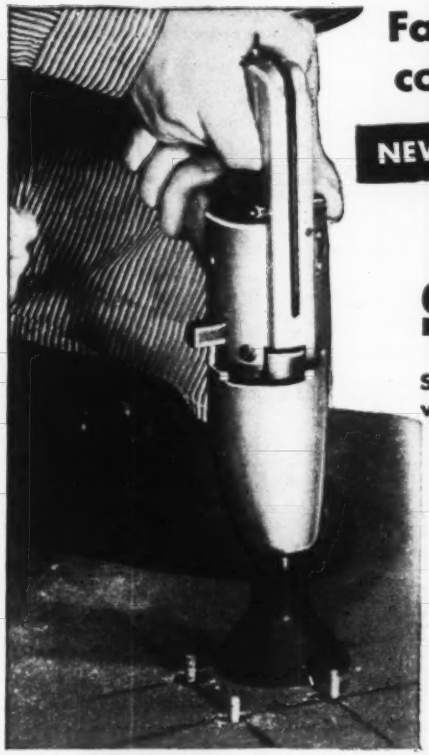
NEW YORK—Stockholders of the Allegheny Ludlum Steel Corp., meeting of December 4, will consider offering about 81,000 shares of preferred stock and further indebtedness to help finance an expansion program.

With a $34.5-million expansion program partially completed, the company recently decided to further the expansion with projects that will total approximately $16.5-million.

• **Ashland Oil & Co.**—Offered publicly $7-million of 20-year debentures and 50,960 of preferred stock at $99 a share. The money will be used for expansion.

• **Three Puerto Rico housing authorities**—Received the best bids for temporary notes from the Bessemer Trust Co. of Jersey City, N. J. as follows: Puerto Rico Housing Authority for $3,562,000; Ponce, P. R., Housing Authority for $1,775,000; and the

(Continued on page 101)



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NEW CARTRIDGE-POWERED MODEL 450

REMINGTON STUD DRIVER

Sets fastening studs up to 100 times faster than conventional methods...needs no outside power source

You can speed construction and maintenance fastening jobs and cut costs with the amazing new Remington Stud Driver. This simple tool attaches steel or wood pieces and fittings to concrete or steel . . . easily sets as high as 5 fastening studs in a minute. No outside power source or other equipment needed. It's compact, rugged, *safe*. Test-proved to be the world's finest fastening system, the Model 450 Remington Stud Driver is made by Remington Arms Company, Inc., America's oldest and foremost sporting arms manufacturer. For detailed information and the name of your nearest distributor, fill out and mail the coupon below. There may be slight initial delays on delivery until production and distribution catch up with demand.

LOOK AT THESE EXCEPTIONAL FEATURES

COMPACT AND PORTABLE — Weighs only 5½ pounds, ideal for scaffold, ladder, overhead work, inaccessible places. Comfortable to use in any position.

SPEED—One man can set up to 5 studs per minute, as much as 100 times faster than other methods. Sets stud at whatever depth is required up to 2¾ inches, depending on material.

ELIMINATES INVESTMENT IN OUTSIDE POWER —Self-powered. Especially useful in isolated places.

TRIPLE SAFE—Plainly visible red dot indicator shows when it's cocked; safety must be depressed before and during squeezing of main trigger; permanently attached safety shield must be compressed against work before Stud Driver will operate. Trigger can't be accidentally tripped. Slight recoil. Low noise level.

WIDE VARIETY OF STUDS are available for every fastening job. Genuine Remington studs are trademarked for user's protection. Pull-out resistance as high as two tons in good concrete, depending on stud used. Cartridges are available in 5 power loads covering practically all fastening needs.

UNIQUE, FAST ASSEMBLY OF STUD AND CARTRIDGE—Tough plastic heel cap permits lightning assembly of any cartridge with any stud, identifies power load, protects head and thread of stud during driving.

PRICE for Model 450 Remington Stud Driver complete in rugged steel carrying case—only $119.50.

How to operate the Model 450 Remington Stud Driver

Hand-assemble stud and power cartridge, load as unit in easy-to-open Stud Driver, close.

Press loaded Stud Driver firmly against working surface, depress safety button, pull trigger.

Explosive charge imbeds stud solidly. Open Stud Driver with twist of the wrist, eject empty shell, load again. Whole job takes seconds!

Speeds all these jobs . . . and many more

1. Hanging steel sash and door bucks to concrete and brick.
2. Anchoring wood plates to concrete floors and ceilings for setting partitions.
3. Fastening wood furring strips to concrete for attachment of metal lath.
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For the first time the builder may procure from a single source a steel door frame, flush swing door and choice of four types of high quality hardware. These new Truscon Residential Steel Doors are smart . . . strong . . . modern. Precision engineered and carefully manufactured. Smooth, quiet, trouble-free in operation.

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Subsidiary of Republic Steel Corporation

Construction business . . .

(Continued from page 98)

Mayaguez, P. R. Housing Authority for $747,000.

• **Oklahoma City and county**—Called for a vote on $7-million highway improvement bonds. The city is seeking $3,498,000 for acquiring right-of-way for urban expressways. The remainder of the bonds will be used on county roads. It is also proposed to finance construction with state and federal funds.

• **Nova Scotia**—Offering $15-million in debentures to cover costs made or to be made for highways, public works, power development and other purposes.

• **Philadelphia** — Sold $7.5-million bonds for gas works expansion in a total sale of various purpose bonds totaling $17,050,000.

• **Maryland**—Offering $10,272,000 in building bonds.

• **Rural Electrification Administration**—Will divide $50-million among the states in rural power loans during the fiscal year ending next June 30. The largest amount, $5,478,799, will go to Mississippi, the state with the largest number of unelectrified farms.

Construction cost indexes show increases

Construction costs were moving up, the indexes all agreed. The Smith, Hinchman & Grylls building cost index for September moved up one point to 257. A rise of four points in July and August over costs in June was reported in a construction cost index of the American Appraisal Co.

The national average leveled off at 535 during the two month period on the American Appraisal Index, over the previous average of 531.

The Aberthaw index of the cost of industrial building increased six-tenths of a point during the quarter ending September 30. It now stands at 373.6. The June 30 reading was 373 and the March reading, 357.

Third quarter industrial building costs remained unchanged for the second successive period, however, according to the Austin company's quarterly index which held steady at 182 (1926 equals 100). The December reading was 179. The index moved up to its present level in March.

Turner Construction Co. reported that its index had risen again. The September reading was 485 (1913 equals 100). The index has climbed steadily since October 1950, when it stood at 452. In February, 1951, the index read 470, and in May, 1951, it read 474.

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JOBS THAT ARE HARD TO HANDLE—TOUGH TO COMPLETE ON SCHEDULE

If you are faced with a construction job that presents special problems because of its size or nature, or the urgency of your time schedule, let M-C & S shoulder it—and the headaches that go with it.

Whatever the field—Industrial, Building, Marine or Heavy Construction—we have the manpower, equipment and know-how, in good measure.

And even more important, you'll find this organization enjoys the really tough jobs. We have the *drive* and *spirit* that makes mole-hills out of mountainous and often unpredictable obstacles—it's part of the M-C & S *tradition* that, for 91 years, has made men proud to serve under the Black Horse Flag.

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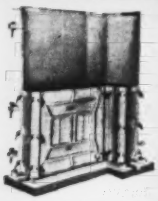

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Standard units of Economy Forms fit most jobs. But where needed, special forms can be built to specification.

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UNIT PRICES BID BY CONTRACTORS

Folsom Dam, Calif.

Relocation of the Rose Spring Ditch was awarded as part of the $29,444,000 Folsom Dam contract for which unit prices were reported in Engineering News-Record, Sept. 27, 1951. The unit prices which follow for the Rose Spring Ditch relocation are part of this contract.

The two low bidders on the whole project were:

1C Merritt-Chapman & Scott Corp., New York and The Savin Constr. Corp.	$29,444,000
2 Winston Bros. Co., Foley Bros., Inc., Al Johnson Constr. Co., C. F Lytle Co.	32,321,409

Items	Unit	Quantity	Unit prices 1C	2
Excavation	cy	21,000	$2.00	$0.90
Compacted dike	cy	800	3.50	0.75
Pneumatic tamp	hr	750	3.00	5.00
Water	M gal	80	5.00	3.50
Concrete	cy	220	100.00	100.00
Steel reinf	lb	10,000	0.20	0.17
Conc ditch lining	lf	500	8.00	7.00
Cobbles	ton	60	7.00	7.00
Misc metal	lb	1,100	2.50	1.10
Lumber	Mfbm	7.5	400.00	320.00
Metal flume	lf	285	10.00	9.00
50" x 31" CM arch pipe, 12ga	lf	60	20.00	16.00
12" CM pipe, 16 ga	lf	40	6.00	3.60
24" weld st pipe dipped & wrapped, 10 ga	lf	3,690	18.00	13.00
20" weld st pipe dip & wr, 10 ga	lf	56	25.00	11.00
24" non-reinf conc pipe	lf	224	8.00	4.00
12" slide ndgte	ea	1	100.00	80.00
24" exp coupling	ea	8	600.00	500.00
24" flex coupling	ea	1	120.00	100.00
20" flex coupling	ea	1	120.00	90.00
4" gate valve	ea	1	100.00	70.00
6" g vlv with elb	ea	2	150.00	110.00
20" gate valve	ea	1	1,000	1,100
24" gate valve	ea	1	1,500	1,600
Pump install	job	1	6,100	9,600
Flow meter	job	1	5,000	4,400
Barb wire fence	lf	10,600	0.50	0.44
Stock-proof fence	lf	5,900	1.50	0.52
Gate in b w fence	ea	4	100.00	65.00
Gate in stock-proof fence	ea	2	150.00	75.00
Remove fence	lf	700	0.50	0.14

Diversion tunnel for Folsom power plant, Calif.

Bids to construct the 1,400-ft diversion tunnel 23 ft high, and access road to power plant for Folsom Reservoir project, California, were received May 1 by U. S. Engineers, Sacramento, from nine contractors, and awarded to the low bidder at $642,692.

The tunnel will be driven through granite which is expected to have hidden seams of badly weathered rock. At least this has been the experience of another contractor who is stripping the site of main dam in the vicinity. This condition makes drilling and blasting difficult. Tunnel driving awaits abutment excavations overhead. Geological conditions are bad. Work started June 15 and must be completed by Feb. 15, 1952. The job is 2 mi from a railroad. All materials are furnished by the contractors.

Wage rates range from $1.70 for common labor to $1.80 for semi-skilled to $1.95 for skilled, with tunnel workers varying from $2.10 to $2.25.

Bidders include:

1C T. E. Connolly, Inc., San Francisco	$642,692
2 Peter Kiewit Sons Co., San Francisco	727,856
9 A. Teichert & Son, Inc., and Bressi & Bevanda, Sacramento, Calif.	1,876,360

Bids: 5-1-51 Items	Unit	Quantity	Unit prices 1C	2
Exc tunnl inlet & outlet	cy	102,000	$1.48	$1.35
Tunnel exc	cy	27,000	11.00	13.00
Steel suppts, furn	lb	42,000	0.15	0.20
install	lb	42,000	0.04	0.25
Timber	Mfbm	17	400.00	250.00
Conc lining	cy	5,000	23.20	30.00
Cement	bbl	6,500	4.50	4.00
Exc roadway	cy	18,000	1.20	1.50
Embankment, road	cy	30,000	0.20	0.20
Water	M gal	1,500	1.50	1.20
Roadway surfacing	ton	1,100	7.00	6.00
24" CM pipe, 14 ga	lf	316	2.40	3.00

Warehouse for Folsom Power Plant

1C G. S. Herrington	$230,956.85
2 Bayshore Construction Co.	319,746.00
11 Sacramento Constr. Co.	397,168.06

Bids: 9-5-51	Unit	Quantity	Unit prices 1C	2
Exc for warehouse	cy	840	$1.00	$2.40
Bckfl for warehouse	cy	640	2.50	1.50
Compactg bckfl for wh.	cy	570	2.50	4.50
Exc & bckfl p.pe trenches	cy	65	2.25	6.00
Pea gravel fill	cy	520	5.00	4.50
Selected surfacing	cy	710	4.50	4.50
Conc in struct	cy	430	34.00	51.00
Conc floor slabs	sf	28,030	0.53	0.60
F&h cement	bbl	1,400	4.40	4.00
F&h reinf bars	lb	51,600	0.125	0.14
F&i sewer pipe	lf	116	1.10	2.50
F&i CI water pipe & fttgs outside wh	lb	22,000	0.18	0.185
F&i fire-hyd assem	assem	2	550.00	525.00
F&i 4" g vlv & vlv box	assem	2	110.00	200.00
Construct warehouse	ls		174,733	252,200

Water line, Fall River, Mass.

Awarded to the third from low bidder "to avoid disputes and delays," 7,200 ft of 6" to 16" watermain to be installed along the side of a new road under construction went for $42,510 to the contractors doing the road work. Consultants to the Water Department of Fall River, Mass. on this improvement are Whitman & Howard, Boston, Mass. Five bidders submitted prices ranging from a low of $34,920 to a high of $56,510.

Work started June 25 and was to be completed Aug. 24. The job is 2 mi from the railroad.

These materials are furnished by the city: 5,100' of 16" CI cement lined pipe, hydrants, valves, gateboxes and fittings, 1,400' of 8" cement lined CI pipe, 150' of 6" CICL pipe. The engineer's estimate for the job is $93,000. The approximate cost on the basis of the award is $89,000.

Wages to be paid range from $2.80 per hr for skilled labor to $2.125 for semi-skilled and $1.475 for common.

1 D'Alessandro & Crognale, Hyde Park, Mass.	$34,920
3c Cal an Constr. Corp., Bristol, R. I.	42,510
5 N. Cibotti & G. Andreassi, Roslindale	56,510

Bids: 6-6-51 Items	Unit	Quantity	Unit prices 1	3 C
16" CI pipe, lay	lf	5,100	$4.00	$2.85
12" CI pipe, lay	lf	10	5.00	4.00
8" CI pipe, lay	lf	1,800	2.00	2.35
6" CI pipe, lay	lf	350	2.00	2.00
Hydrants, inst	ea	11	50.00	100.00
12" gate valves, inst	ea	5	50.00	40.00
8"	ea	5	10.00	30.00
6"	ea	12	10.00	30.00
Conc for backing	cy	10	15.00	25.00
Experimental trench	cy	50	5.00	2.00
7" pit macadam	sy	250	4.00	8.50
2 1/2" bit conc	sy	230	2.00	6.50
Ledge	cy	1,230	6.00	14.00
Selected mat'l	cy	200	1.00	4.00

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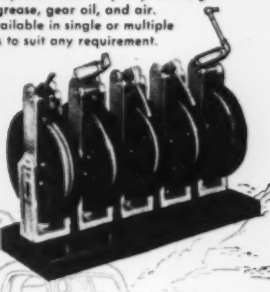

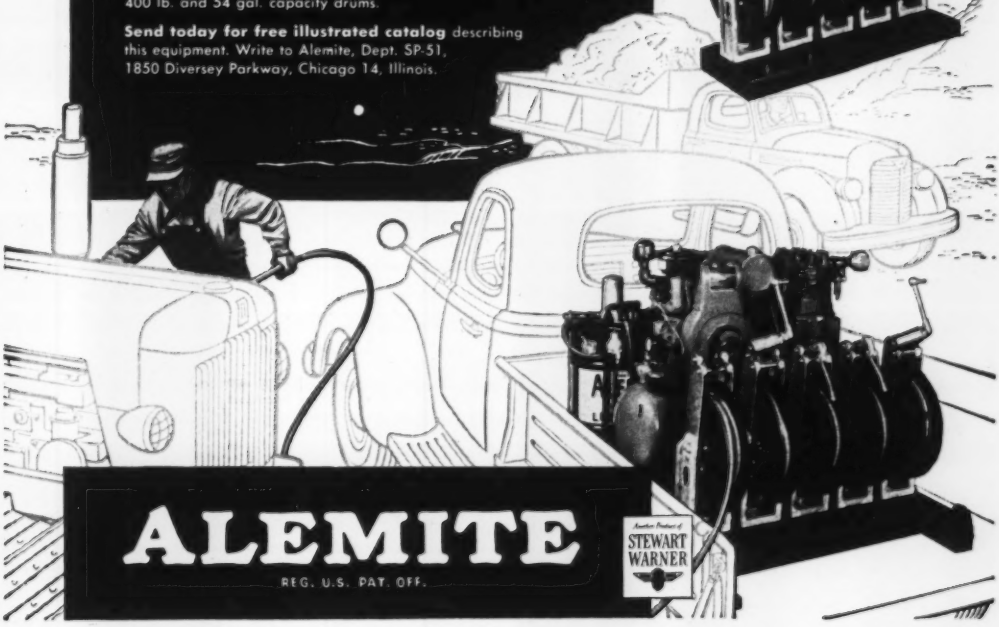

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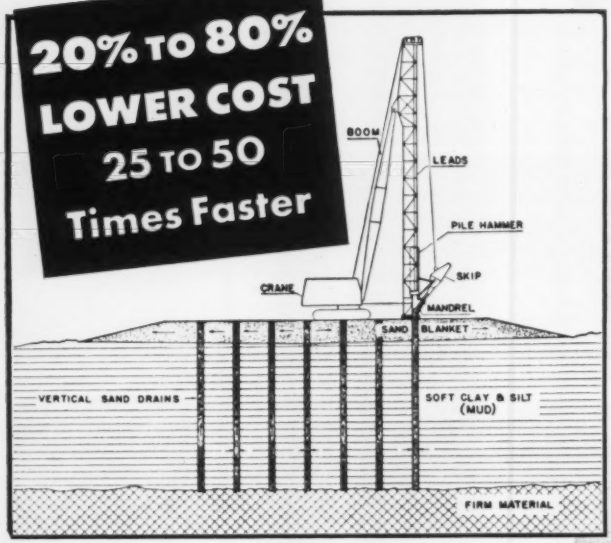

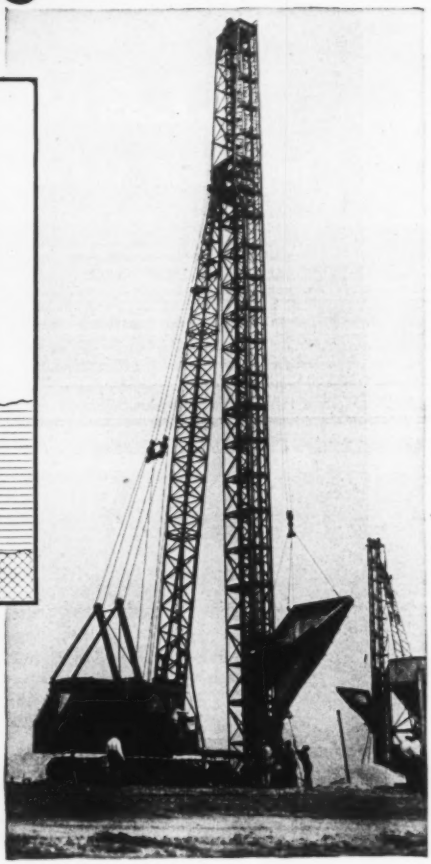

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CONSTRUCTION REPORTS

Bids Asked—Low Bidders—Contracts Awarded

Compiled by Business News Department—Engineering News-Record, 330 W. 42nd St., New York 18, N. Y.

ELSIE EAVES, Manager — *J. A. MAHONEY, Reports* — *M. R. ROESSLER, Statistics*

NEW ENGLAND

BIDS ASKED—HEAVY CONSTRUCTION

† **Connecticut**—B.A. 10/16—U. S. Eng., 857 Commonwealth Ave., Boston, 15, Mass., channel imprv. Norwalk River, Norwalk, Serial No. Eng 19-016-52-11. CD 5/29; under LB.

BIDS ASKED—BUILDINGS

Mass., Needham—SCHOOL—B.A. 10/19—Town, J. S. Slicer Jr., chn, School Bldg. Comn., Town Hall, 1 story school, incl. gymnasium and cafeteria, Broad Meadow Rd. $675,000. Plans deposit $25, Kilham Hopkins Greeley & Brodie, 9 Arlington St., Boston, archts. Hugh A. Stubbins, 103 Pleasant St., Lexington, assoc. archt. CD 8/15.

Vt., Burlington—LABORATORY—B.A. 10/23—State, State Bldg., Council, State House, Montpelier 3 story public health laboratory, Colchester and East Aves. $350,000. Plans deposit $25. Freeman, French & Freeman, 138 Church St., Burlington, Vt., archts. CD 10/28/49.

HEAVY CONSTRUCTION

LOW BIDS AND CONTRACTS

MAINE—State Hy. Comn., State House, Augusta,
Normandy Constr. Co., Inc., 52 Ashton St., Everett, Mass. LB $216,715. bit. macad. 3.134 mi. F. A. Proj. F 032-1 (2), Belgrade; LB $161,743, bit. macad. 1.726 mi. F. A. Proj. F 032-2 (1), Farmington and Strong.
A. P. Wyman, Inc., Waterville, Me. LB $87,046, b.-conc. 1.429 mi. F. A. Secondary Proj. S 0205 (1), Rockland.
Harold Hornbrook, 696 W. Main St., Madawaska, Me. LB $130,518. bit. grav. 3.561 mi. F. A. Secondary Proj. S 0319 (2), K T-1-R-4 and Macwahoc. Bids Sept. 26. CD 9/19.
Bay State Dredging & Contg. Co., 62 Condor St., East Boston, Mass. LB $96,958, dredging channel basin drainage, Oak Bluffs, Dukes Co., MASSACHUSETTS, Commonwealth of Mass., Dpt. Pub. Wks., 120 Nashua St., Boston, Mass. Awarded Sept. 25.

BUILDINGS

LOW BIDS AND CONTRACTS

City, Gas & Electric Dpt., 70 Suffolk St., Holyoke, Mass. Separate Contracts. $150,000, light and power air PLANT, Gas Works River Bank, HOLYOKE, MASS. CD 7/13.
Sciaba Co., 86 Shawmut Ave., Boston, Mass. LB $919,800. SCHOOL, Keslar Ave., Ward 7; A. Cefalo & Sons, 42 Bennett St., Lynn, Mass., LB $873,000, SCHOOL, Essex St., Silver Lake Dist., LYNN, MASS. City, School Dpt., 42 Franklin St., Lynn, Mass. Bids Sept. 25. CD 8/24.

MIDDLE ATLANTIC

BIDS ASKED—HEAVY CONSTRUCTION

N. Y., New York—B.A. 10/15—At office Chief Engineer of the Port of New York Auth., 111 8th Ave., New York, Zone 11, construct superstructure for connections to Henry Hudson Parkway, Stage I, at Manhattan Approaches to George Washington Bridge, Cont. GWB-130.002. Plans deposit $25. CD 4/17/50.
N. J., Trenton—B.A. 10/16—Div. Purchase & Property State House Zone 7, general construction and electrical work in connection with constr. sewage disposal plant at Jones Farm of N. J. State Hospital. Plans deposit $25.
N. Y., New York—PLAYGROUND IMPRVS.—B.A. 10/16 Comr. Parks, Dpt. Parks, Arsenal Bldg., Central Park, 64 St. and 5 Ave. Zone 21, repaving, installing iron fence in playground on west side of Frank D. Roosevelt Dr. between E. 102 and E. 103 Sts., Manhattan Boro, Contr. No. M-108-251; construct playground between Nelson and Woodycrest Aves., south of W. 166 St., Bronx Boro, Cont. No. XG-11100-149N. Plans deposit $10. CD 8/2/45.
N. Y., New York—B.A. 10/16—President Bronx Boro, Bronx County Bldg., 851 Grand Concourse, Zone 51, Sect. 3, construct storm relief sewer and appurtenances in easterly side of Eastchester Rd. from existing storm sewer at point approx. 80 ft. south of Barnard St. to existing overflow chamber at Morris Park Ave. CD 2/4/43.
† **N. Y., West Point**—ELECTRICAL SERVICE REHABILITATION—B.A. 10/16—Dpt. Army, Office of the Quartermaster, West Point, electric service rehabilitation of north end of post, Inv. No. MA-30-145-52-17.
N. Y., New York—B.A. 10/17—Bureau Contracts & Accounts, Albany, dredging coal dock at Manhattan State Hospital, Wards Island. Plans deposit $5.
N. Y., New York—B.A. 10/23—Bd. Water Supply, 120 Wall St., Zone 5, Contr. 387, clearing approx. 1,150 acres, grubbing about 475 acres and required excavation, seeding and removal of excrementitious material, The Neversink Reservoir, in preparation for storage of water, in town of Neversink. CD 6/16/44.
† **N. Y., Niagara Falls**—AIRFIELD FACILITIES—B.A. 10/24—U. S. Eng., 80 Lafayette St., New York, Zone 13, airfield facilities at Niagara Falls Air Force Base, Part II. Plans deposit $45, Crenshaw, Beardsley, King & Assoc., 2112 Erie Blvd., East Syracuse, engrs.-archts.
† **Md., Andrews Air Force Base**—PAVING—B. A. on or about 11/6—U. S. Eng., First and Douglas Sts. N.W., Wash. 25, D. C., airfield paving between runways, taxi-ways and aprons. Eng. 49-080-52-23-19.
† **Md., Andrews Air Force Base**—READINESS HANGAR B. A. on or about 11/6—U. S. Eng., First and Douglas Sts. N.W., Wash. 25, D. C., 155x232 ft. masonry readiness hangar with 100 ft. clear spans steel trusses, incl. outside utilities, water, sewer and electric distr. Eng. 49-080-52-24 (20).
▲ **N. Y., New York**—B.A. 11/15—Dpt. P. Wks., Municipal Bldg., Zone 7, construct Welfare Island Bridge over east channel of East River connecting Welfare Island with Queens Boro. $3,934,000. Plans deposit $50. Knappen, Tippetts, Abbett Eng. Co., 62 W. 47 St., Zone 19, engr. CD 11/25/49.

BIDS ASKED—BUILDINGS

Pa., Lacey Park—SCHOOL—B.A. 10/15—Warminster Twp. School Bd., Lacey Park School, Lacey Park, general constr.; heating, plumbing and drainage, electrical work in connection with constr. of school. Plans deposit $50 general constr., $25 others. Davis, Dunlap & Craver, 1717 Sansom St., Phila., archts.
N. Y., Forest Hills—SCHOOL—B.A. 10/19—Supt. School Bldgs., Design and Constr., 49 Flatbush Ave. exten. Brooklyn, Zone 1, general constr.; plumbing and drainage; heating and ventilating; electrical and lighting fixtures P. S. 200, 164 St. between 71 and Jewel Aves., Queens Boro. Plans deposit $16, general constr. $7 each others.
N. Y., Flushing—CITY BLDG.—B.A. 10/25—Comr. Parks, Dpt. Parks, Arsenal Bldg., Central Park, 64 St. and 5 Ave., New York, Zone 21, Cont. No. X-99-751, restoration and alterations; Cont. Q-99-851; electrical work; Cont. Q-99-951, plumbing; Cont. Q-99-1051, heating and ventilating work in connection with restoration and alteration of City Bldg., incl. demolition of structures in adjacent park areas, Flushing Meadow Park. Plans deposit $10 Cont. Q-99-751, $5 each for others.

SOON LETS CONTRACT—BUILDINGS

Pa., Lancaster—SCIENCE—Wm. H. Lee, archt., 16 S. Broad St., Phila., soon lets contract North Museum Bldg., and Science Bldg. for Franklin & Marshal College, Lancaster, $625,000. Charles H. Wolf, 112 S. 16 St., Phila., engr. CD 8/30.
▲ **Pa., Phila.**—HOSPITAL—Lakenau Hospital, Corinthian and Girard Aves., soon lets contract hospital, Overbrook Sect. $6,000,000. Vincent G. Kling, 917 Corinthian Ave., archt. George M. Ewing, Western Saving Fund Bldg., assoc. archt. CD 5/18.

PROJECTS COVERED

Projects—By Size

Construction projects here reported cover the United States and Canada, are of these minimum sizes or larger: water supply, earthwork, waterways $34,000; other public works $60,000; industrial buildings $82,000; other buildings $300,000.

Classes of Construction

(Name in order of Listing)

Water Supply	Latin America
Sewers, Waste Disposal	Public Buildings
Bridges	Commercial Buildings
Streets & Roads	Industrial Buildings
Earthwork, Waterways	Unclassified

Stages Reported

PROPOSED WORK: Including appointment of engineers or architects.

BIDS ASKED (new announcements only). For full calendar, see also preceding issues of ENR.

LOW BIDDERS: On jobs below $500,000 value all low bidder news will be the final reports published on the projects inviolved except where award is not made to the low bidder. In this case, a supplementary contract award report will be published.

CONTRACTS AWARDED: Except awards to low bidders previously reported in low bidder stage.

Dates shown are of issue in which last previous report was published.

Symbols and Abbreviations Include:

†	Federal Government
▲	Project of $1,000,000 or over.
B.A.	Bids Asked
ENR	Engineering News-Record
CD	Engineering News-Record Construction Daily

HEAVY CONSTRUCTION

LOW BIDS AND CONTRACTS

▲ **NEW JERSEY**—State Hy. Dpt., State Hy. office Bldg., 1035 Parkway Ave., Trenton,
The Grandview Constr. Corp., 740 S. Fulton Ave., Mount Vernon, N. Y., LB, $1,606,399, dualization of Route 28, Section 30 from Bethlehem-Union Twp. line to N. Y. Women's Reformatory, 4.249 mi. Fed. Aid Proj. FI-64 (9) Hunterdon Co.;
Villa Contg. Co., Inc., 233 North Avenue W., Westfield, N. J., LB, $308,985, paving, topsoiling and appurtenant work for Service Areas, 10 N and 10-S of N. J. Turnpike, Woodbridge Twp., Middlesex Co.;
cancelled bids to have been opened Sept 1st, reconstr. .0128 mi. intersection of Route 25 and S-28 New Brunswick Middlesex Co. Bids Sept. 25. CD 9/7.
▲ **Eastern Eng. Co.**, 4 N. Caroline Ave., Atlantic City, N. J. CA, $4,691,998, main sewage treatment plant, Primary treatment, general construction, Contr. 5, CAMDEN, N. J. City Purch. Bd., City Hall, Camden, N. J. Bids Sept. 12. CD 9/18.
▲ **PENNSYLVANIA**—State Hy. Dpt., 506 N. Office Bldg., Harrisburg,
D. T. Connelly, 475 Allison Ave. Washington, Pa., LB, $205,356, roadway with crushed aggregate base and bit. surf. 5.605 ft. L. R. 64143 (1), 64118 (1), Westmoreland Co.;
The Ray F. Yount Co. Inc., P. O. Box 101, Kittanning, Pa., LB, $199,896, wid'n. 22.490 ft. existing pavement with crushed aggregate base and bit. surf., and surf. existing pavements with bit. surf. T. R. 66, Armstrong Co.;
Kingston Contg. Co., Latt.mer Mines, Pa., LB, $185,954, construct 4.491 ft. divided hy. with rein.-con. pavement T. R. U. S. 611, Montgomery Co.;
John H. Swanger, Inc., P. O. Box 1214, Lancaster, Pa., LB, $288,317, construct 21.939 ft. roadway with crushed aggregate base and bit. surf. T. R. 103, Mifflin Co.;
H. B. Sproul Constr. Co., 222 W. Olive St., Scranton 8, Pa., LB, $122,201, consrtuct 5,571 ft. roadway with crushed aggregate base and bit. surf. L. R. 35069 (1), Lackawanna Co.;
Charles Riebe, Lansford, Pa., LB, $137,114, construct 3.280 ft. roadway with crushed aggregate base and bit. surf. T. R. 209, Carbon Co.;
The S. T. Brotemarkle Constr. Co., P. O. Box 393, Cumberland, Md., LB, $539,931, construct 25.429 ft. roadway with crushed aggregate base and bit. surf. T. R. 164, Cambria Co.;
Freeland Constr. Co., 402 Keystone Bldg., Pittsburgh 22, Pa., LB, $158,544, construct 5,451 ft. plain c. conc. base and bit. surf. new and existing pavement T. R. 18; 930, Beaver Co. Bids Sept. 28. CD 9/11.

PENNSYLVANIA—State Hy. Dpt., 506 N. Office Bldg., Harrisburg,
Indiana Contg. Co., N. 6 St., Indiana, Pa., CA $959,941, c. conc. 2.9 mi., four rein.-con. structures; 2 rein.-con. bridges, one structure and 2 bridges are over Elder Run in Leechburg Boro and northerly, T. R. 66, Armstrong Co. Bids Aug. 31. CD 9/5, under LB.
▲ **Leo Butler Co.**, Box 97, College Park, Md., LB, $968,003, Contr. 1, portion of sewerage sys.;
Anthony Crestone & Co., 68 Tuxedo Rd., Montclair, N. J. LB, $606,371, Contr. 3, portion of sewerage sys.;
C & T Constr. Co., 810 Haddon Ave., Collingswood, N. J. LB, $479,651, Contr. 4, general constr. treatment plant;
Dravo Corp., Broad St. Station Bldg., Phila., Pa., LB, $126,900., Contr. 5, mechanical work on treatment plant,
received no bids Sept. 27. Contr. 2, portion of sewerage sys., Contr. 7, heating and ventilating treatment plant.; Contr. 8, plumbing work on treatment plant, MORRISVILLE, PA. Morrisville Boro Auth., Morrisville, Pa., Bids Sept. 27. CD 9/13.

MARYLAND—State Rds. Comn., 108 E. Lexington St., Baltimore, Zone 2,
Harry T. Campbell Sons Corp., Towson, Md. LB stone $250,967. surf., wid'n. 4.5 mi. State Rte. 26 from Randallstown to North Branch, Contr. B 633-415, Baltimore Co.
Bituminous Constr. Co., 3101 Ridgewood Ave., Baltimore, Md. LB $210,568. bit.-con. wid'n. resurf. 2.57 mi. U.S. Rte 50, Contr Q 252-1-215, Queen Anne's Co.
C. William Hetzer, Marion St., Hagerstown, Md. LB $62,877. c. conc. w.d'n. patching 2.95 mi. U.S. Rte. 40, Huyett to Wilson, Contr. W 420-615, Washington Co. Bids Sept. 25. CD 9/12.

BUILDINGS

LOW BIDS AND CONTRACTS

▲ **W. E. O'Neil**, 2751 Clybourn Ave., Chicago 14, Ill., CA Total est. $2,500,000 1 story, 240,000 sq. ft. SERVICE and DISTRIBUTION BLDG. with OFFICES, DEWITT, N. Y. Western Electric Co., 22 and Cicero Sts., Chicago, Ill. CD 9/21.

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BUCYRUS, OHIO

Bd. Educ., Orangetown School Dist. 15, Tappan, N. Y., rejected bids Sept. 17, SCHOOL addn., alterations, Washington Ave., TAPPAN, N. Y., will re-advertise. CD 9/13.

Charles B. Henbling & Son, 107 Monmouth St., Red-bank, N. J., CA, $570,000, general contract, new SENILE BLDG. at N. J. State Hospital, MARLBORO, N. J. Div. Purchase & Property, State House, Trenton, 7, N. J. Bids Aug. 21 awarded Sept. 28. CD 8/24, under LB.

▲ Joseph Bryan, 171 River Rd., North Arlington, N. J., CA, $4,000,000, PLANT, incl. docks, bulkheads, railroads, RIVERTON, N. J. Hoeganaes Sponge Iron Corp. (formerly Swedish Sponge Iron and Metal Power Corp.), 545 Fifth Ave., New York, N. Y. CD 3/21.

▲ Andrew Christensen & Son, Inc., 225 West Grant St., Elizabeth, N. J., CA, $1,183,864, general contract MENS GROUP, WOMEN'S GROUP and BERGEN GROUP at State Village for Epileptics, Montgomery Twp., SKILLMAN, N. J. Dpt. Purchase & Property, State House, Trenton, 7, N. J. Bids Sept. 17, awarded Sept. 28. CD 9/19, under LB.

Darjol Realty Corp., 601 Bangs Ave., Asbury Park, N. J., Separate Contracts, $750,000, SHOPPING CENTER, TOMS RIVER, N. J.

Welsh Homes, Inc., 11 E. Fayette St., Baltimore, Md. Owner Builds. $504,000. fifty-six 2 story, 21x34 ft., masonry row type DWELLINGS, 1500 to 52, 1501 to 57, Burnwood Rd., BALTIMORE, MD. CD 1/22.

The MacRose Co., 611 Munsey Bldg., Baltimore, Md. Owner Builds. $415,000. 83, 14x31 ft. masonry row type HOUSES, 1500 to 50, 1501 to 51, Elrino St., 6100 to 16 and 6101 to 43, Cardiff Ave., BALTIMORE, MD.

Sherrill-Noonan, Inc., York, Pa. CA $500,000. 216x234 ft., brick, concrete WAREHOUSE, OFFICE and SHOWROOM, BALTIMORE, MD., Alexander Smith & Sons Carpet Co., 725 N. Point Rd., Baltimore, Md. CD 4/12.

Eastern Building Co., Court Square Bldg., Baltimore 2, Md. Owner Builds. $510,000. sixty 2 story, 16x32 ft., row type HOUSES, 6931-47 Bank St., 6928-40 Bank St., 7001-45 and 7000-72 Bank St., BALTIMORE MD. CD 12/8/50.

▲ William P. McDaniel, Dover, Del., Separate Contracts, $1,130,000, RESIDENTIAL DEVELOPMENT, between Rts. 113 and 113A, DOVER, DEL.

SOUTH

BIDS ASKED—HEAVY CONSTRUCTION

† Va., Norfolk—AVIATION GASOLINE DISTRIBUTION SYS.—B.A. 10/16—Pub. Wks. Office, Headquarters, Fifth Naval Dist., U. S. Naval Base, Zone 11, aviation gasoline distr. sys. addns. at the Craney Island Fuel Facility, Naval Supply Center, NOY 28431, Spec. 30076. Plans deposit $25.

Ga., Blairsville—EXPERIMENT STATION—B.A. 10/17—Bd. Regents, University System of Georgia, 20 Ivy St. N.E., Atlanta, experiment station. Plans deposit $50. R. Kennon Perry, Mortgage Guarantee Bldg., Atlanta, Ga., archt.

Fla., Jacksonville—TRANSMISSION LINE—B.A. 10/18—City, City Hall, constr. 69KV double circuit transmission line between Georgia St. Switching and Talleyrand Ave. Sub-station. Plans deposit $7.50. Reynolds, Smith & Hill, 227 Park St., engrs.

† Kentucky—B.A. 10/18—U. S. Eng., 830 W. Broadway, Louisville, Zone 3, constr. Sect. 2, Part I, Newport flood protection, incl. concrete work, driving sheet piling in cell wall, sewer work, etc., CIVENG 15-029-52-39.

† Ky., Lexington—B.A. 10/18—U. S. Eng., P. O. Box 59, Louisville, Zone 1, 250,000 gal. elevated steel water tank, Blue Grass Ordnance Depot, Eng. 15-029-52-11. CD 9/28, under Public Bldgs.

La., Westwego—B.A. 10/18—Town, WW imprvs. $100,000. Fromherz Engineers, 823½ Poydras St., New Orleans, engrs. CD 5/16.

† Fla., Cocoa—MISSILE SHOPS, etc.—B.A. About 10/23—U. S. Eng., P. O. Box 4970, Jacksonville, missile shops, air force missile test center, Patrick Air Force Base, Serial No. Eng 08-123-52-50. CD 4/4.

Fla., Orlando—B.A. 10/23—City, WW. sys. addns. Robert & Co., Assocs., 98 Poplar St. N. W., Atlanta, Ga., engrs. CD 9/6/43.

† Ky., Lexington—B.A. 10/23—U. S. Eng., P. O. Box 59, Louisville, Zone 1, replacement wood pipe, Blue Grass Ordnance Depot, Eng. 15-029-52-12. CD 9/28, under Public Bldgs.

† Va., Chincoteague—AVIATION FUEL STORAGE—B.A. 10/23—Pub. Wks. Office, Hedaquarters, Fifth Naval Dist., U. S. Naval Base, Norfolk, Zone 11, jet aviation fuel storage at Naval Air Station, NOY 28559, Spec. 30212. Plans deposit $10.

† Ky., Lexington—HARDSTANDING—B.A. 10/30—U. S. Eng., 830 W. Broadway, Louisville, Zone 3, constr. hardstanding for ordnance vehicles, Blue Grass Ordnance Depot, Eng. 15-029-52-17. CD 9/28, under Public Bldgs.

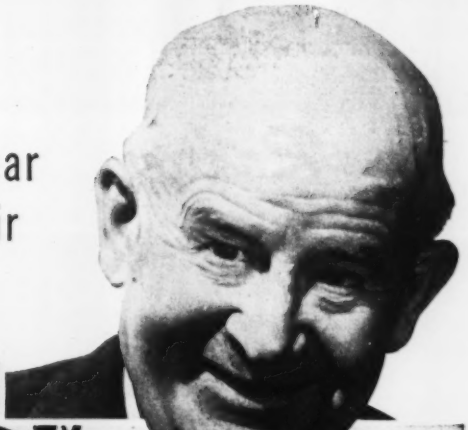
BIDS ASKED—BUILDINGS

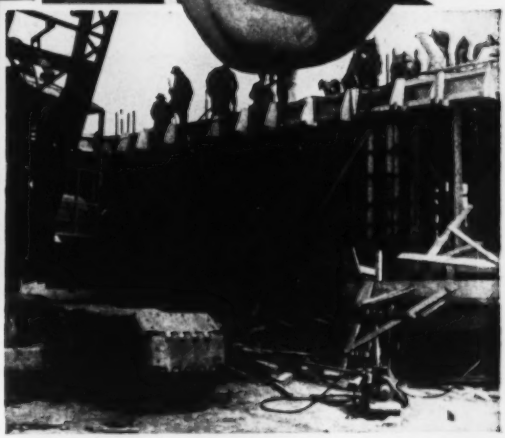
Fla., Miami—SCHOOL—B.A. 10/17—Dade Co. Bd. P. Instruction, 275 N.W. 2 St., Shadowlawn School addn., Robert F. Smith, 201 Shoreland Bldg., archt. CD 11/5/45.

Miss., Indianola—SCHOOL—B.A. 10/19—Indianola Separate School Dist., Indianola 37,000 sq. ft. Colored Elementary School, $300,000. Plans deposit $25. E. L. Malvaney, Millsaps Bldg., Jackson, archt. CD 9/5.

(Continued on page 109)

How to Save Wear and Tear on Your Hair





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HYDRAULICS Rodgers

Rodgers Hydraulic, Inc.

7441 WALKER ST., ST. LOUIS PARK, MINNEAPOLIS, MINN.

HYDRAULIC POWER EQUIPMENT

(Continued from page 106)

Ala., Birmingham — CHURCH — B.A. 10/23 — Hunter Street Baptist Church c/o Geo. P. Turner, archt., American Life Bldg., church, $600,000. Extended date. CD 7/20.

La., Pineville—NURSING HOME—B.A. 10/23—State. Div. Admin., Baton Rouge, psychiatric nursing home at Central Louisiana State Hospital. Plans deposit $50. Chas. R. Lamkin, 2703 Lee St., Alexandria, archt.

Va., Fairfax—COURT HOUSE—B.A. 10/24—Fairfax Co., Court House, steel, concrete addn. to county court house, Lee-Jackson Memorial Hy. and Chain Bridge Rd. $980,000, Plans deposit $25. Robert H. Willgoos, 123 N. Fairfax St., Alexandria, archt. CD 12/14/50.

Ala., Sheffield—HOUSING—B.A. 10/25—Sheffield Housing Auth., Sheffield, 46 housing units Project Ala 68-2, $350,000. Plans deposit $50. Howard A. Griffith Jr., Sheffield, archt. Extended date. CD 8/20.

HEAVY CONSTRUCTION

LOW BIDS AND CONTRACTS

The Virginia Dare Constr. Co., Elizabeth City, N. C., CA. two 100 ft. jetties to north and south of Courtney Terrace Hotel, VIRGINIA BEACH, VA. City, Virginia Beach, Va. CD 8/30, under LB.

Powell Bros., Fort Lauderdale, Fla., CA. $65,000, 4,805 ft. seawall for apartment development, FORT LAUDERDALE, FLA. Victor Nurmi, c/o contractor.

Coleman Trainor & Co., Huntington, W. Va. LB $69,617, mixing coagulation and sedimentation plant at water treatment plant, ELIZABETHTOWN, Ky. City, Elizabethtown, Ky. Bids Sept. 18. CD 9/12.

Price Brothers, 1932 E. Monument St., Dayton, O. LB $231,044, 19,000 ft. 30 in. rein.-con. pipe for connection to General Electric Plant, Benchel, Ky., LOUISVILLE, KY. Louisville Water Co., 5 S. Third St., Louisville 2, Ky. Bids Sept. 24. CD 9/5.

Morrison & Conklin Constr. Co., 4005 Crittenden Dr., Louisville, Ky. LB $116,000. 1,100 ft. 60 in. concrete 26 St. Relief Sewer, LOUISVILLE, KY. Metropolitan Sewer Dist., 414 W. Jefferson St., Louisville, Ky. C. S. Vance, c/o owner, engr. Bids Sept. 24. CD 4/22/48.

Howell Engineering Co., Carbondale, Ill. CA $62,240. surf. parking ramp for airliners, etc., Barkley Field, PADUCAH, KY. Paducah Corp., Paducah, Ky. Bids Aug. 8. CD 8/1.

BUILDINGS

LOW BIDS AND CONTRACTS

Tidewater Constr. Corp., 538 Front St., Norfolk, Va. CA. 80x140 ft. WAREHOUSE, SOUTH NORFOLK, VA. Chilean Nitrate Sales Corp., N. & W. R. R. Norfolk, Va.

John F. Coulton, 1534 Lake Dr., Pompano Beach, Fla., Owner Builds, Approx. $300,000, APARTMENT DEVELOPMENT, POMPANO BEACH, FLA.

W. L. Holcomb, Inc., Clarksdale, Miss. Owner Builds. $850,000. 101 HOMES, CLARKSDALE, MISS.

Krause & Monagan, Inc., Lafayette, La. Owner Builds. $62,000. WAREHOUSE, LAFAYETTE, LA.

Gervais F. Favrot Co., Baltzer Bldg., New Orleans, La. CA $662,670. CHURCH and RECTORY, NEW ORLEANS, LA. St. Rita Roman Catholic Church, 2630 Pine St., New Orleans, La. Bids Aug. 13. Bids 7/10 rejected. CD 7/24, under LB.

▲ **Girdler Corp.,** 224 E. Broadway, Louisville, Ky. CA $2,000,000. chemical PLANT, CALVERT CITY, KY. B. F. Goodrich Chemical Corp., Rose Bldg., Cleveland, O. CD 7/27.

MIDDLE WEST

BIDS ASKED—HEAVY CONSTRUCTION

Ind., Fort Wayne—SPUR TRACK, etc.—B.A. 10/16—Bd. P. Wks., City Hall, spur track, unloading trestle and appurtenant structure. Drury, McNamee & Porter, Ann Arbor, Mich., engrs. CD 10/10/45.

† **O., Columbus**—COMMUNICATIONS DUCT and OVERHEAD LINES—B.A. 10/26—U. S. Eng., 237 Fourth Ave., Huntington 18, W. Va., communications duct and overhead lines (Phase C), Lockbourne Air Force Base, Serial No. ENG 46-022-52-63. CD 9/25.

BIDS ASKED—BUILDINGS

Mich., Comstock—SCHOOL—B.A. 10/17—Comstock Twp., Carl Walker, secy. Bd. Educ., brick, concrete Eastern and Western School addns. $300,000. Louis C. Kingscott & Assoc., Inc., 511 Monroe St., Kalamazoo, archt.

Mich., Mount Clemens — SCHOOL — B.A. 10/17 — Bd. Educ., High School Building, 2 story, brick Seminole Hills School addn., Mulberry and Sargent Sts. $320,000. Plans deposit $25 refundable. Giffels & Vallet Inc., L. Rossetti Associated Architects & Engineers, 1000 Marquette Bldg., Detroit, archts.

Ill., Chicago—LABORATORY—Bids Asked—Presbyterian Hospital, Wood and Harrison Sts., 20,000 sq. ft. Rawson Laboratory top addn. $400,000. Burnham & Hammond, 53 W. Jackson Blvd., archts. CD 12/5/50.

HEAVY CONSTRUCTION

LOW BIDS AND CONTRACTS

Frisina Amusement Co., 421½ S. 5 St., Springfield, Ill., and Mrs. Freda Paul, Carlinville, Ill., Separate Contract, $100,000 400-car drive-in theatre on Route 108 1 mi. west of city, screening tower, projection and concessions bldg. in-a-car speakers, etc., CARLINVILLE, ILL. George M. Petersen, 11305 Clifton Rd., Cleveland 2, O., archt. CD 1/3/50.

WISCONSIN—State Hy. Comn., State Office Bldg., Madison.

I. H. Pertzsch, Onalaska, Wis., LB, $62,978, Contract 1, structures B-32-12 and B-32-15, The S.T.H. 33-Bangor (Anderson Bridge and Dutch Creek Bridge) Road Proj. S c122 (1) and S 0122 (2), La Crosse Co., LB, $89,854, Contract 1, structures and approaches 0.879 mi. The S.T.H. 33-Barre Mills (Bostwick Bridge) (Miller Bridge) and (Maskak Bridge) Road C.T. Hy. "M" Proj. S 0123 (2) and S 0123 (3) and S 0123 (4) La Crosse Co., LB, $65,713, Contract 1, structures and approaches 0.659 mi. The Holman-Mindoro (Lee Bridge) and S.T.H. 162-Mindoro (Young Bridge) Road; C.T. Hys. "Q" and "D" Proj. S 0121 (L) and S 0121 (3), La Crosse Co.

Edward Kraemer & Sons, Plain, Wis., LB, $77,725, Contract 4, structure B-33-1, the Platteville Mineral Point Road, U. S. Hy. 151, Proj. F012-1 (3E), Lafayette Co. Bids Sept. 25. CD 9/7.

WISCONSIN—State Hy. Comn., State Office Bldg., Madison.

J. R. Griffith Co., Racine, Wis., LB, $213,060. Contract 1, grading, draining 5.284 mi. The Waukesha County Line-S.T.Hy. 60 and Slinger-U.S.H. 41 Roads, U.S.Hy. 41 and S.T. Hy. 60, Proj. F 03-1 (37) and F 067-1 (1), Washington Co.

L. G. Arnold, Inc., Eau Claire, Wis., LB, $305,806, Contract 1, grading, draining 13.408 mi. The West County Line-Bloomer Road and Main St., City of Bloomer S.T. Hy. 40, Proj. S 058 (3) and T 058 (4), Chippewa Co.

Koshak Bros., Park Falls, Wis., LB, $149,657, Contract 1, grading, draining The Rhinelander-Eagle River Road S.T. Hy 17, Proj. S 0287 (2), Oneida Co.

Victor Nerslon, Superior, Wis., LB, $66,220, Contract 1, base course 2.48 mi. The West County Line-S.T.H. 27 Road, S.T. Hy. 70, Proj. S 0157 (3), Sawyer Co.

Schuette Builders, Manitowoc, Wis., LB, $117,382, Contract 1, c.conc. 0.328 mi. East Scott Street and Winnebago Dr., U.S. Hy. 151 and S.T. Hy. 55, City of Fond du Lac, U 4702 (3), Fond du Lac Co.

Arthur Overgaard, Elroy, Wis., LB, $65,729, Contract 2, grav. or crushed stone base, 3.61 mi. The Sparta-Camp McCoy Road, S.T. Hy. 21, Proj. T 0319 (4), Monroe Co. Bids Sept. 25. CD 9/7.

▲ **MICHIGAN**—State Hy. Dpt., 222 Townsend St., Lansing, Zone 13.

Pierson Contg. Co., 609 Eddy Bldg., Saginaw, Mich. CA $1,046,787. grading, drainage 5 in. min. capp ng, widn. 10 in. uniform rein.-con. 7.061 mi. M-97, F 50-7, C5 (F 421 1), Macomb Co.

Cooke Contg. Co., 1116 Penobscot Bldg., Detroit, Mich. CA $527,289. grading, drainage, 9 in. uniform conc., 44 ft. wide 2.723 mi. M-29, U 50-51, C1 (U 423 1), Macomb Co. CD 9/18, under LB.

MICHIGAN—State Hy. Comn., 213 E. Capitol Ave., Lansing.

Ayling Asphalt Paving Co., Adrian, Mich. CA $507,486. B. conc. 16.535 mi. US-223 and M-50, M 58-3, 63, M 46-28, C4, M 46-6, C8, M 46-13, C22, M 46-20, C4. CD 6/7, under LB.

BUILDINGS

LOW BIDS AND CONTRACTS

▲ **Steinle-Wolfe Co.,** Fremont, O., CA. Approx. $1,000,000, jet engine parts FACTORY, FREMONT, O. Bingham-Herbrand Corp., R. W. Kerr, pres., Fremont, O. CD 5/15.

Comte Constr. Co., 912 Summit St., Toledo, O. CA. Approx. $90,000, 1 story, 60x200 ft., masonry WAREHOUSE, for steel storage, 3011 Manhattan Blvd., TOLEDO, O. Sullivan Steel Co., 252 Ottawa St., Toledo, O. Peterson, Hoffman & Grow, Spitzer Bldg., Toledo, engrs.-archts.

▲ **Warren Eng. Co.,** Warren, O., CA. Total est. $5,000,000 first sect., FACTORY addn. to plant, first sect. to have 20,000 sq. ft. floor space, mfg. jet engine parts, Dietz Ave., WARREN, O. American Welding & Mfg. Co., W. J. Sampson, Jr., pres., Warren, O.

Henry M. Martens Co., 2111 Woodward St., Detroit, Mich. CA $640,000. 2 story, bsmt., steel, concrete, brick Ford Elementary SCHOOL, Orangelawn, DETROIT, MICH. City, Bd. Educ., Detroit, Mich. Bids Sept. 10. CD 9/5.

F. R. Orr Constr. Co., 2926 Kearney St., Denver, Colo. CA. $300,000, 35,000 sq. ft. WAREHOUSE and offices, NORTHFIELD, ILL. Studebaker Corp., Northfield, Ill. Awarded Sept. 20.

Campbell Constr Co., 9301 Michigan Ave., Detroit, Mich. CA. $100,000, 1 story, 80x170 ft., brick, masonry FACTORY and OFFICE, Second Blvd., DETROIT, MICH. Cadillac Plastic Co., 651 W. Baltimore St., Detroit, Mich. Paul Tilds & Assoc., 18000 James Couzens Dr., Detroit, Mich., archts.

▲† **F. H. Taylor Co.,** 17360 Lahser Rd., Detroit, Mich. CA $3,000,000. brick, steel DEVELOPMENT and RESEARCH BLDG., Detroit Edison Center Line, DETROIT, MICH. U. S. Eng., 2015 Cadillac Tower, Detroit, Mich. CD 9/27.

Winkler & Co., 15517 Mack St., Detroit, Mich. CA. $100,000, 1 story, brick, masonry PLANT addn., Grandy St., DETROIT, MICH. Walter Kidde & Co., Inc., 3900 Grandy St., Detroit, Mich. Schley & Ward, 16851 James Couzens Dr., Detroit, Mich., archts.

WEST OF MISSISSIPPI

BIDS ASKED—HEAVY CONSTRUCTION

▲† **Tex., San Angelo**—RUNWAYS—B.A. 10/23—U. S. Eng., 1127 Texas and Pacific Bldg., Fort Worth, 385,000 sq. yd. asph. type paving runways for Van Court Auxiliary Airfield. $1,000,000. Extended date. CD 9/29.

† **Tex., Lackland Air Base (Br. San Antonio)**—SWITCHING STATION, etc.—B.A. 10/26—U. S. Eng., 606 Santa Fe Bldg., Galveston, primary switching station and overhead primary lines in thruout bldg. area. $100,000. CD 3/23.

▲ **Texas and Oklahoma**—PIPE LINE—Bids Asked—Continental Pipe Line Co., c/o Oil and Gas Bldg., Houston, Tex., 225 mi. 12 in. crude oil pipe line from Wichita Falls, Tex. to Ponca City, Okla. $5,900,000. CD 9/14.

BIDS ASKED—BUILDINGS

† **Colorado**—SUB-STATION, etc.—B.A. 10/16—Bureau Reclamation, Dpt. Interior, Fort Collins, constr. Fort Collins, R.E.A. sub-station and access road and addition to Flatiron temporary sub-station Colorado Big Thompson Proj., Spec. 704C-210. L. N. McClellan, ch. engr.

▲ **Minn., Virginia**—HOUSING—B.A. 10/18—Virginia Redevelopment & Housing Auth., Dr. D. A. Sher, chn., Silver Lake Housing, two 2 story, bsmnt., 25x108 ft. Type A buildings; five 2 story, bsmnt., 24x78 ft. Type B buildings; four 2 story, bsmnt., 25x43 ft. Type C buildings; thirteen 2 story, bsmnt., 24x65 ft. Type D buildings; one 15x25 ft. Type E building, 1 story, bsmnt. 23x35 ft. admin. bldg. $1,700,000. Plans deposit $25, Damberg & Damberg, Virginia, archts. C. Foster, 316 Medical Arts Bldg., Duluth, consult., engr.

SOON LETS CONTRACT—BUILDINGS

Okla., Tulsa—LABORATORY—Douglas Aircraft Co., 3000 Ocean Park Blvd., Santa Monica, Calif., soon lets contract 3 story, brick, concrete steel frame and fdn., electronic test laboratory, heating and dust control, air-conditiong etc. $750,000. Coston & Frankfurt, OEA Bldg., 323 E. Madison St., Oklahoma City, archts.

HEAVY CONSTRUCTION

LOW BIDS AND CONTRACTS

Fred Eisert, Mechanicsville, Ia., CA. $128,449, sewer extension and imprvt., etc., HARLAN, IA. City, Harlan, Ia. Bids Sept. 14. CD 8/30.

† **Paul E. Crawley Contg. Co.,** Cambridge City, Ind. LB $36,166. emergency repairs on 16 levees, setback levees on right bank of Missouri River, DeWitt to Lupus Bends, Inv. 52-49, MISSOURI, U. S. Eng., 601 Davidson Bldg., Kansas City 8, Mo. Bids Sept. 26. CD 9/21.

† **McNab & Martin,** Winfield, Kan. LB. $66,480. emergency levee repairs right bank Missouri River, Lupus to Cote Sans Dessein Reaches Mile 129, Inv. 52-48, MISSOURI, U. S. Eng., 601 Davidson Bldg., Kansas City 8, Mo. Bids Sept. 26. CD 9/18.

E. M. Stites Constr. Co., Malden, Mo. CA $80,000. WW imprvs., exten., appurtenances, incl. sand filter, and appurtenances, exten. existing bldg., force draft aerator, 750 GPM high service pump, 500,000 gal. rein.-con. reservoir, 750 GPM booster pump, 3,750 lin. ft. 12 in. c.i. pipe laid, DEXTER, MO. City, Thomas J. Ross, mayor, Dexter, Mo. Bids Sept. 24. CD 9/17.

▲ **Fred Weber Contractor, Inc.,** 7929 Alabama Ave., St. Louis 11, Mo. CA $1,078,587, est. $1,678,595. 150x5,400 ft. north-south runway, 200x2,800 ft. exten. of east-west runway, 75x6,000 ft. taxiway at Lambert-St. Louis Municipal Airport, Robertson, St. Louis Co., ST. LOUIS, MO. City, Frank McDevitt, pres. Bd. Pub. Service, 304 City Hall, St. Louis 3, Mo. CD 9/24, under LB.

City, Bradford, Ark., rejected bids Sept. 13 sewerage sys., disposal plant, BRADFORD, ARK. LB, $90,050. Will re-advertise. CD 9/26, under LB.

† **U. S. Eng.,** 1709 Jackson St., Omaha, Neb. cancelled bids to have been opened Sept. 28, outdoor switchgear and station service equip. for Fort Randall Dam and Reservoir Proj., near Lake Andes, SOUTH DAKOTA, Inv. 52-19. Will re-advertise. CD 8/30.

Abel Constr. Co., 895 N. 16 St., Lincoln, Neb., CA $139,168, est. $142,000, paving Dist 1150 on Hartley, Richmond and other streets, LINCOLN, NEB. City, City Hall, Neb. Bids Sept. 19. CD 8/13.

† **Storms-Freu Constr. Co.,** 6601 E. 37 St., Kansas City 3, Mo. LB $161,380. emergency levee repairs left bank Kaw River, North Topeka, Inv. 52-60, KANSAS, U. S. Eng., 601 Davidson Bldg., Kansas City 8, Mo. Bids Sept. 24. CD 9/18.

▲ **OKLAHOMA**—Oklahoma Turnpike Auth., 200 N. E. 23 St., Oklahoma City, Zone 5.

Ellicott Bros., Inc., Enid, Okla., CA. $507,447, est. $440,687, grading, drainage 3.088 mi. Pike near Bristow, Creek Co.;

Clark & Farrell Co., Pine Bluff, Ark., CA. $356,550. est. $350,912, grading, drainage 1.9 min. Turnpike near Bristow, Creek Co.; CA. $383,800, est. $368,714, grading, drainage, 2.9 mi. Turnpike near Bristow, Creek Co.;

Amis Constr. Co., 1647 Exchange St., Oklahoma City 8, Okla., CA. $314,280, est. $329,318, grading, drainage 2.5 mi. Turnpike, Creek Co. Grand total $1,562,077. Bids Sept. 25, awarded Sept. 26. CD 9/10.

OKLAHOMA—Oklahoma Turnpike Auth., 100 N. E. 23 St., Oklahoma City, Zone 5.

rejected bids Sept. 25, grading, drainage 3.5 mi Turnpike at Wellston, Lincoln Co. L. B. $576,201., Est. $516,205. CD 9/10.

Port of Corpus Christi, c/o Wharf Headquarters, Corpus Christi, Tex., Own Forces. $45,000. water sys., CORPUS CHRISTI, Tex.

Port of Corpus Christi, c/o Wharf Headquarters, Corpus Christi, Tex., Own Forces. $85,000. drainage, site earthwork, grading, CORPUS CHR STI, TEX.

City, Snyder, Tex., Owner builds. $45,000. addnl. water lines, SNYDER, TEX. CD 2/12.

City, Snyder, Tex., Own Forces. $75,000. addnl. sanitary sewerage sys. exten., SNYDER, TEX. James V. Curnutte, Transit Tower, San Antonio, Tex.

† **General Electric Co.,** 640 17 St., Denver, Colo. LB $119,400. Schedule 1, five 115,000 volt circuit breakers, Missouri River Basin Proj. Spec. DS 3519,

MONTANA. Bureau Reclamation, Dpt. Interior, Bldg. 1A, Denver Federal Center, Denver, Colo. Bids Sept. 20. CD 8/15.

Douglas Jardine, 516 S. Tejon St., Colorado Springs, Colo., LB, **$43,763**, Pikeview Pump House and installing pipe line; LB **$47,086**, repairs, imprvs. Monument Creek diversion dam and pipe line leading from dam, COLORADO SPRINGS, COLO. City, Colorado Springs, Colo. CD 6/4/45.

▲† **Gerald Mora**, Box 2623, Houston, Tex., LB, **$1,002,467**, est. $500,000. P.O. L. Facilities, Inv. No. Eng 29-005-52 6, Walker Air Force Base, ROSWELL, N. M. U. S. Eng., Box 1538, Albuquerque, N. M. Bids Sept. 27. CD 9/12.

BUILDINGS

LOW BIDS AND CONTRACTS

American Lumber Co., 218 N. Highway, Waterloo, Ia., CA $500,000, department STORE, CEDAR FALLS, IA. Blacks Realty Co., Black Bldg., Waterloo, Ia. Larson & McLaren, 1901 Foshay Tower, Minneapolis, Minn., archts. M. B. Clemand, Waterloo, Ia., assoc. archts. (**Correction**—location of project.) CD 9/27, under Wis., Cedar Falls.

▲ **Dickie Constr. Co.**, 317 N. 11 St., St., St. Louis 1, Mo. CA $1,200,000, general constr.; **Stupp Bros. Bridge & Iron Co.**, 3800 Weber Rd., St. Louis 23, Mo. CA $300,000, steel fabrication and erection 1 story, mezzanine, brick, stel, concrete FACTORY, 2 story, overall 124,000 sq. ft. OFFICE on 12 acre site, 1201 Macklind Ave., ST. LOUIS, MO. Joy Manufacturing Co., 4235 Clayton Ave., St. Louis 10, Mo. Certificate of Necessity granted. Bids Sept. 7. CD 9/7.

V & M Contg. Co., Inc., 4030 Chouteau Ave., St. Louis 10, Mo. CA **$85,000**. 1 story, 15160 ft., 60x175 ft. L-shaped OFFICE, addn., parts department and warehouse, 5049 Fyler Ave., ST. LOUIS, MO. M & V Investment Co., 4343 Clayton Ave., St. Louis 10, Mo. C. A. Price, 705 Chestnut St., St. Louis 1, Mo., engr.

▲ **Arkansas Power & Light**, Simmons National Bldg., Pine Bluff, Ark., Day Labor, **$10,000,000**, constr. GENERATING UNIT at Lake Catherine Plant, HOT SPRINGS, ARK. CD 7/16/48.

Omaha Public Power Dist., 17 and Harney Sts., Omaha, Neb. Owner Builds. **$120,000** SUB -STATION, 18 and Grant Sts., Omaha, NEB. A. G. Johnson, c/o owner, ch. engr.

Custom Built Homes Co., C. D. Joy, pres., 5811 Mission Rd., RFD from Kansas City, Kan. Owner Builds. **$600,000**. 100 HOUSING units, Shawnee Rd. and Anton Rd., Wyandotte Gardens, Chester Ave., Francis St., Mallier Court, Wyandottte Co., KANSAS CITY, KAN.

C. P. Davis, 5072 Mission Rd., RFD from Kansas City, Kan. Owner Builds. **$600,000**. 100 HOUSING units, Springvale subdivision, Wyandotte Co., KANSAS CITY, KAN.

Bob Eldridge Constr. Co., 1227 Key Rd., RFD Kansas City, Kan. Owner Builds. **$900,000**. 140 HOUSING units, 5300 Swartz Rd., 3 mi. west of Argentine, KANSAS CITY, KAN.

Frank L. Hawkins, 2200 Woodland Blvd., RFD from Kansas City, Kan. Owner Builds. **$600,000**. 100 HOUSING units, near U. S. 40 and Cahill Rd., Floradale subdivision, Wyandotte Co., KANSAS CITY, KAN.

▲ **Don McCully**, Huron Bldg., Kansas City, Kan. Owner Builds. $1,000,000. 175 HOUSING units, east of 47 St. and south of Garfield Ave., ½ mi. west of Kansas City in W. Seeman Heights, KANSAS CITY, KAN.

▲ **Winn-Rau Constr. Co.**, 7701 State St., Kansas City, Mo. Owner Builds. $1,000,000. 200 HOUSING units, on 2 tracts southwest edge of Argentine Dist., KANSAS CITY, KAN.

▲ **W. G. McMillan**, Box 1447, Lubbock, Tex. LB, $1,461,690. CHURCH and EDUCATIONAL bldgs., Lubbock, TEX. First Methodist Church, Lubbock, Tex., Bids Sept. 25. CD 9/17.

H. E. Butt Grocery Co., Robstown Rd., Corpus Christi, Tex. Owner Builds. $200,000. 2nd unit of WAREHOUSE, SAN ANTONIO, TEX. W. E. Simpson Co., Milam Bldg., San Antonio, Tex., engr.

▲ **Chemical Constr. Co.**, 488 Madison Ave., New York, N. Y. CA. Approx. $1,750,000. CHEMICAL PLANT, TEXAS CITY, TEX. Texas City Chemicals, Inc., Texas City, Tex. CD 9/21.

FAR WEST

BIDS ASKED—HEAVY CONSTRUCTION

† **Washington**—B.A. 10/18—Bureau Reclamation, Coulee Dam, preliminary drilling for stabilization of right bank, Grand Coulee Dam, Columbia Basin Proj., at Coulee Dam, Spec. DC 3553. L. N. McClellan, Bldg. 53, Denver Federal Center, Denver, Colo., ch. engr.

† **California**—B.A. 10/19—Bureau Reclamation, Dpt. Interior, Goleta, Glen Anne Dam, Cachuma Proj., Spec. DC-3482. Bids 8/7 rejected. CD 8/23, under LB.

HEAVY CONSTRUCTION

LOW BIDS AND CONTRACTS

† **UTAH**—Bureau P. Rds., Dept. Commerce, Federal Bldg., Ogden,

L. A. Young Constr. Co., Richfield, Utah. CA. **$84,500**, bit. surf. 11.816 mi. U. S. Forest Hy. between Cove Fort and Sevier, Beaver and Sevier Counties. B. W. Matteson, c/o owner, div. engr. Bids Sept. 12.

▲† **Gunther & Shirley**, 714 W. Olympic Blvd., Los Angeles, Calif., CA, **$3,065,000**, HANGAR bldg. at Litchfield Park, Spec. 29068, GOODYEAR, ARIZ. Eleventh Naval Dist., 1220 Pacific Hy., San Diego, Calif. Bids Sept. 13. CD 8/22.

WASHINGTON—State Hy. Dpt., Olympia,

N. Florito Co., 844 W. 48 St., Seattle, Wash., CA **$159,287**, rein.-con. overcrossing of Hy. 2 on Mercer Island, together with draining, grading and Type 1, b. conc. paving 0.348 mi. F.A.P. FI 002-1 (5), King Co.

P. J. Anderson Co., 13501 Aurora Ave., Seattle, Wash., CA, **$127,268**, bit. 0.122 mi. approach to Columbia River bridge at Longview, Cowlitz Co. Bids Sept. 25. CD 9/11.

WASHINGTON—State Hy. Dpt., Olympia, Wash., rejected bids Sept. 25, rein.-con. slab bridge over Speelyai Creek on Hy. 1-S, Cowlitz Co. Bids CD 9/11.

WASHINGTON—State Hy. Dpt., Olympia, Wash.

Fiorito Bros., 1100 Leary Way, Seattle, Wash. LB $571,065, clearing, draining, grading 2.401 mi. Highway 1, Centralia south F.A.P. FI-001-2 (9), Lewis Co. Bids Sept. 25. CD 9/11.

▲ **Lake Arrowhead Sanitation Dist.**, Court House, Lake Arrowhead, Calif., rejected bids Sept. 24, sewage collection system, treatment plant, effluent works, LB $1,259,590, est. $656,600. LAKE ARROWHEAD, CALIF. CD 9/5.

▲† **MacDonald & Kruse**, 7540 Wheatland Ave., Los Angeles, Calif., LB **$1,248,000**, exten. runway, 22-L, Spec. 29715, LOS ALAMITOS, CALIF. Eleventh Naval Dist., San Diego, Calif. Bids Sept. 27. CD 9/19.

† **Franks Dredging Co.**, 5030 W. Point Loma Blvd., San Diego, Calif., LB **$438,147**, 1,023,710 cu. yd. dredging and filling Mission Bay, SAN DIEGO, CALIF. City Council, City Center, San Diego, Calif. Bids Sept. 25. CD 9/5.

BUILDINGS

LOW BIDS AND CONTRACTS

† **David M. Sweeney & Triangle Building Co.**, Idaho Falls, Idaho, CA. **$165,063**. Nurses APARTMENT, Dugway Proving Grounds, TOOELE, UTAH. U. S. Eng., 74 New Montgomery St., San Francisco, Calif. Bids Aug. 30. CD 8/8, under LB.

Harold A. Ashton Bldg. Co., 2025 E. 22 St., Tucson, Ariz., CA **$743,800**, 4 story BUSINESS and PUBLIC ADMINISTRATION BLDG., TUCSON, ARIZ. University of Arizona, Tucson, Ariz. Awarded Sept. 22. CD 1/28/49.

T. P. Schultz, 1115 E. Rosecrans St., Compton, Calif., LB **$512,950**, Poplar Street SCHOOL, COMPTON, CALIF. Compton City School Dist., 604 S. Tamarind St., Compton, Calif. Bids Sept. 24. CD 9/11.

Milton Kauffman Constr. Corp., 2918 W. Compton Blvd., Gardena, Calif., CA, **$382,879**, est. $350,000, 1 story masonry SCIENCE BLDG., LAWNDALE, CALIF. El Camino Junior College Dist., 3031 Redondo Beach Blvd., Lawndale, Calif. Bids Sept. 21, awarded Sept. 25. CD 9/5.

Consolidated-Western Steel Corp., 5700 S. Slauson St., Maywood, Calif., LB **$429,762**, fabricating, erecting structural steel for Units 1 and 2, Valley STEAM PLANT, LOS ANGELES, CALIF. Los Angeles Dpt. Water & Power, 207 S. Broadway, Los Angeles, Calif. Bids Sept. 27. CD 9/12.

Crown Constr. Co., 1231 S. La Brea Ave., Los Angeles, Calif., LB, $531,830, est. $422,220, 1 story, steel, stucco Roses Road SCHOOL, SAN GABRIEL, CALIF. San Gabriel School Dist., 301 S. San Gabriel Blvd., San Gabriel, Calif. Bids Sept. 25. CD 9/5.

ALASKA

BIDS ASKED—HEAVY CONSTRUCTION

Alta., **Calgary**—Bids Asked—City, Civic Bldg., street and railway overpasses at 4 St. W. and 9 Ave. $700,000. Haddin, David & Brown Ltd., 513 Eight Ave. W., Calgary, engrs., and J. Ivor Strong, city engr. CD 1/25.

CANADA

BIDS ASKED—HEAVY CONSTRUCTION

Newfoundland — DETACHMENT — B.A. 10/24 — Secy., Dpt. P. Wks., Hunter Bldg., Ottawa, Ont., R.C.M.P. Detachment Bldg. at Ferryland and Harbor Breton, Approx. $400,000. Plans deposit $25 each. G. Brault, c/o owner, archt.

HEAVY CONSTRUCTION

LOW BIDS AND CONTRACTS

Campbell—Bennett Ltd., 718 West 5 Ave., Vancouver, B. C. CA. $568,990, John Hart hydro-electric power development extension on Campbell River, BRITISH COLUMBIA. B. C. Power Comn., Victoria, B. C. Awarded Sept. 24.

PROPOSED PROJECTS

WATER SUPPLY

La., **Edgard**—St. John the Baptist Parish, voted **$400,000** bonds, WW imprvs.

Okla., **Chickasha**—City, voted bonds, water plant and water main extens. **$415,000**. Alexander & Pollard, Terminal Bldg., Oklahoma City, consult. engrs. CD 9/12.

SEWERS, WASTE DISPOSAL

▲ **Ark., Hot Springs—City, $3,600,000 bond election** Nov. 6, sanitary sewers and sewage treatment plant, auxiliaries, appurtenances, Ralph, W. Delaney, 131 S. Rennie St., Dada, Okla., consult. engr. CD 8/16.

▲ **Ind., Indianapolis**—Bd. P. Wks., E. A. Gardner, chn. City Hall, Zone 4, main sewer, Boyd Ave. **$734,000**; main sewer E. 10 St. and Ritter Ave., **$2,276,400**; main storm sewer E. 32 St. and Washington Blvd., **$989,500**. W. R. Hunt, City Hall, city engr. Chas. W. Cole & Son, 220 W. La Salle St., South Bend, consult. engrs. CD 5/3.

Kan., Pittsburg—City, voted $840,000 bonds Sept. 18, sewage plant, A. C. Kirkwood & Assoc., Wirthman Bldg., Kansas City, Mo., consult. engrs. CD 7/31.

▲ **Va., Arlington**—Arlington Co., County Court House, bond election Nov. 6, storm sewer constr. **$1,382,000**.

Wash., Wenatchee—City, City Hall, sewage disposal plant, $500,000. J. Dunstan, city engr.

† **T. H., Lualualei**—Dpt. Navy, Bureau Yards and Docks, 18 St. and Constitution Ave. N. W., Wash. 25, D. C., sewage disposal plant, Naval Ammunition Depot. **$660,000**.

BRIDGES

▲ **Fla., Miami**—City, City Hall, **bond election Nov. 27**, bridges. **$1,850,000**. CD 11/8/44.

▲ **La., Covington**—St. Tammany and Jefferson Parishes Police Jury, voted **$40,000,000** bonds causeway across Lake Pontchartrain. CD 8/30.

Saskatchewan—Dpt. P. Wks., Hunter Bldg., Ottawa, Ont.

Prince Albert—1,000 ft. long with center span of 170 ft., two 150 ft. spans on either side and one 110 ft. span on each side of these, bridge at Prince Albert, **$900,000**. Robert Blais, c/o owner, ch. engr. CD 9/29.

STREETS AND ROADS

▲ **Fla., Miami**—City, City Hall, bond election Nov. 27, street paving, **$2,000,000**. CD 4/26/46.

▲ **Va., Arlington**—Arlington Co., County Court House, bond election Nov. 6, streets and highways imprvs. $1,318,000.

▲ **WASHINGTON**—State Hy. Dpt., Olympia,

Benton and Yakima Counties—Byron-Alfalfa, **$1,000,000**.

Stevens Co.—realignment and surf. hy. 6-A, Tiger Rd., $100,000. W. A. Bugge, state hy. dir.

▲† **Alaska, Anchorgae**—Alaska P. Wks., Dpt. Interior, Juneau, paving 187 blocks of streets, $3,000,000.

EARTHWORK, WATERWAYS

▲ **Tex., Houston-Harris Co.** c/o Flood Control Dpt., Court House, flood control in Brays Bayou area, $14,500,000; flood control, Buffalo Bayou area, $8,000,000; in White Oaks Bayou area, $6,000,000. H. R. Jensen, Scanlan Bldg., engr. CD 4/22/48.

▲† **Washington**—Bureau Reclamation, Dpt. Interior, Interior Bldg., 19 and C Sts. N. W., Wash., 25, D. C., third powerhouse, with 750,000 kw capacity at Grand Coulee Dam, Grand Coulee, **$150,000,000**.

▲† **Japan, Yokosuka**—Dpt. Navy, Bureau Yards and Docks, 18 St. and Constitution Ave., N. W., Wash. 25, D. C., dredging and ext. quay wall at Forrestal Causeway, Marginal Wharf along Sherman Seawall. $2,557,500.

AIRPORTS

▲† **Ky., Fort Campbell**—AIRPORT IMPRVS.—U. S. Eng., 830 W. Broadway, Louisville, plans by J. Stephen Watkins, 251 High St., Lexington, airfield paving, storage, lighting, troop and family housing, administration, shops and utilities, at Campbell Air Force Base. **$3,026,000**.

▲ **Mass., East Boston**—HANGAR—Commonwealth of Massachusetts, Aeronautics Comn., Admin. Bldg., Logan Airport, East Boston, hangar to be leased to private airlines by state, **$2,500,000**. CD 4/13/48.

▲† **O., Dayton**—AIRPORT IMPRVS.—U. S. Eng., 830 W. Broadway, Louisville, Ky., fighter apron, 25,000 sq. yds. c. conc. paving; approx. 31,500 sq. ft. permanent type film storage bldg. addn.; storage facilities for rocket propellant, one open shed, approx. 4,000 sq. ft. non-combustible type with necessary outside utilities; propeller control fatigue bldg., approx. 36,000 sq. ft. permanent type constr.; 3 story, bsmt.; 24,000 sq. ft. permanent type constr. aero-medical laboratory, high-altitude research bldg.; 2 story 2,600 sq. ft., permanent type constr. engine set up bldg., shop bldg.; 500,000 gal. elevated steel tank, 852nd Spec. Depot; A.C. fueling servicing equip. test facilities, approx. 3,200 cu. ft. permanent type constr.; 1 story, approx. 7,000 sq. ft. permanent type constr.; radiological instrument test bldg.; permanent type constr. engineering shop bldg. exten. at Wright Patterson Air Force Base, Approx. **$35,000,000.**

(Continued on page 112)

CASE HISTORY OF A SUCCESSFUL TUNNEL JOB

FROM THE EIMCO FILE T104

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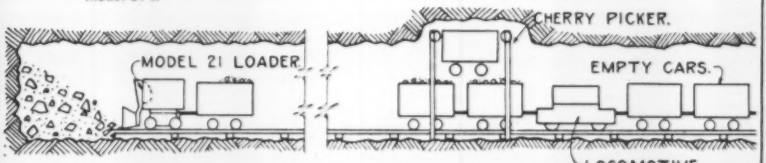
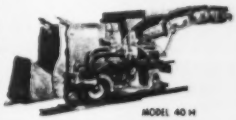
The Carlton Tunnel — driven to dewater the valuable mining claims in the Cripple Creek district of Colorado. Total length 32,267 feet. Tunnel size 10' x 11'. Average depth round 7.14 feet. Rounds in good ground averaged 8' and 9' mucking time less than an hour. Best month 1870 feet, best day 78', mucking machines—Eimco Model 21's.



Carlton Tunnel used the "cherry-picker" method of car switching with the overhead lift equipped with an air cylinder. The cherry-picker was mounted on skids so that it could be moved forward, by the locomotive, as required.

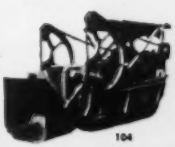
MODEL 12-B

MODEL 21


MODEL 40 H

MODEL 15

103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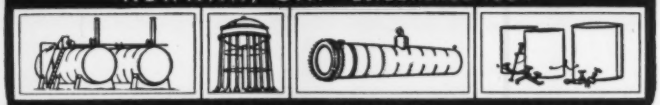

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(Continued from page 110)

▲† **Okla., Altus**—AIR BASE—U. S. Eng., P. O. Box 61, Tulsa, army air base, **$17,842,000.** Hudgins, Thompson, Ball & Assoc., 1100½ W. Main St., Oklahoma City, consult. engrs.-archts. CD 6/27.

▲† **Pa., Pittsburgh**—AIRPORT—U. S. Eng., 121 N. Broad St., Phila., fuel storage, barracks, admin. bldg., warehouse, housing and mess, Moon Twp. $3,263,000. Hunting, Larsen, Dunnells, Inc., 130 7th St., engr.

▲† **S. C., Greenville**—AIR BASE EXTENS., etc.—Dpt., Navy Officer Charge Constr., Box 365, Naval Base, Charleston, Donaldson Air Force Base extens., rehabilitation. $39,700,000.

▲† **S. C., Sumter**—AIR BASE EXTENS., etc.—Dpt. Navy, Officer Charge Constr., Box 365, Naval Base, Charleston, Shaw Air Force Base extens., rehabilitation. $39,700,000.

▲† **Tex., Austin**—AIR BASE—U. S. Eng., 606 Santa Fe Bldg., Galveston, 3,000-man barracks, $7,154,000; 66-units bachelor quarters, $396,000; 16,000 sq. ft. officers mess $300,000; 55,000 sq. ft. administration, $825,000; classroom and training bldg. $300,000; 150x1,330 ft. runway extens. $160,000; 50x7,000 ft. taxiway, $280,000; 12 refueling units $720,000; storage or warehouse for 14,500 bbl. fuel, $100,000; central telephone, storage and warehouse, $116,000; 21,000 sq. ft. base operations bldg. $300,000; 20,000 sq. ft. aircraft maintenance shop $330,000; 23,000 sq. ft. armament electronics repair shop, $280,000; outside lighting area lighting sys. $75,000; 6 igloos for storage and bomb storage, $118,000; 6,700 sq. ft. refrigeration storage, $141,000; water supply and elevated steel tank water storage, $176,000; natural gas sys. $100,000; sanitary sewers, $281,000; storm sewers, $223,000; drainage and general grading, levelling, earthwork, $183,500; steam lines sys., $91,000; heating plant, $150,000; area hard paving, $160,000; communications facilities, $95,000, at Bergstrom Air Force Base. CD 8/15.

▲† **Cuba, Guantanamo Bay**—AIR STATION—Dpt. Navy, Bureau Yards and Docks, 18 St. and Constitution Ave., N. W. Wash. 25, D. C., Naval Air Station addns. $2,785,200.

▲† **Guam, Agana**—AIR STATION—Dpt. Navy, Bureau Yards and Docks, 18 St. and Constitution Ave. N. W. Wash. 25, D. C., Naval Air Station imprvs. $4,697,100.

▲† **Marshall Islands, Kwajalein**—AIR STATION—Dpt. Navy, Bureau Yards and Docks, 18 St. and Constitution Ave. N. W. Wash. 25, D. C., Naval Air Station addns. $7,266,200.

▲† **Newfoundland, Argentia**—AIR STATION—Dpt. Navy, Bureau Yards and Docks, 18 St. and Constitution Ave. N. W. Wash. 25, D. C., Naval Air Station addns. $3,256,000.

▲† **Okinawa, Naha**—AIR FACILITY—Dpt. Navy, Bureau Yards and Docks, 18 St. and Constitution Ave. N. W. Wash. 25, D. C., Naval Air Facility addns. $3,864,000.

▲† **Philippine Island, Sangley Point**—AIR STATION—Dpt. Navy, Bureau Yards and Docks, 18 St. and Constitution Ave., N. W. Wash. 25, D. C., Naval Air Station addns. $2,198,700.

▲† **T. H., Barber's Point**—AIR STATION—Dpt. Navy, Bureau Yards and Docks, 18 St. and Constitution Ave. N. W., Wash. 25, D. C., Naval Air Station addns. $3,507,900.

LATIN AMERICA

Mexico, Mexico City—Aceros Ecatepec, S. A., Ejido, 7-109, Mexico City, plans steel works. $500,000.

AMERICANS ABROAD

▲ **Australia, Melbourne**—Ford Motor Co. of Australia, c/o Ford Motor Co., 3000 Schaefer St., Dearborn, Mich., U. S. A. mfg. and production plants expansion. $16,800,000.

PUBLIC BUILDINGS

▲† **Ala., Anniston**—ORDNANCE WORKS—U. S. Eng., 2301 Grant St., Mobile 7, plans by Pembleton & Mims, Title Guarantee Bldg., Birmingham, magazine and test firing range, air compressor bldg. and protective structures at Anniston Ordnance Works. $11,182,000.

▲ **Ala., Tuscaloosa**—City, plans by Raymond Sizemore, 16 S. Hull St., Montgomery, Senior High School, $1,250,000; Colored Industrial High School, $750,000. CD 2/1/46.

Calif., Colton—SCHOOL—Colton High School Dist., Colton, plans by Kistner, Curtis & Wright, 816 W. 5 St., Los Angeles, 46,700 sq. ft., rein.-con., stucco high school, $800,000. CD 1/23.

Calif., Los Gatos—HOSPITAL—West Valley Hospital, Los Gatos, defeated $750,000 bonds, constr. 50 bed hospital, Campbell and Saratoga Areas. CD 7/25.

Calif., Norwalk—SCHOOL—Norwalk School Dist., 12110 E. Walnut St., plans by Kistner, Curtis & Wright, 816 W. 5 St., Los Angeles, Site J, 1 story, 28,500 sq. ft., frame, stucco school, $500,000.

▲ **Calif., San Francisco**—COMMUNITY CENTER—City and San Francisco Co., Dpt. P. Wks., City Hall, plans by Wurster, Bernardi & Emmons, 402 Jackson St., San Francisco, Sunset Community Center, 10 block area bounded by 38 Ave., Ortega St., 41 Ave. and Rivera St. $7,500,000.

† **Colo., Denver**—WAREHOUSES—U. S. Eng., 1709 Jackson St., Omaha, Neb., 15 warehouses for Rocky

Mountain Arsenal, $600,000. Linder, Hodgson & Wright, Insurance Bldg., Denver, Colo., consult. engrs. and archts.

Fla., Miami—POLICE BLDG.—City, bond election Nov. 27, police bldg. $860,000.

▲ **Ill., Joliet**—SCHOOL IMPRVS.—Bd. Educ., Joliet, heating plant, shop, physical plant, imprvs. to Joliet Twp. High School, $2,000,000. CD 3/4/46.

Ill., Rock Island—HOSPITAL—Rock Island Co., Court House, plans by Mel Beckstrom, 1518 Fifth Ave., Moline, 1 story, brick, stone, Rock Island County Convalescent hospital, $750,000. CD 9/20/50.

▲ **Ind., Muncie**—HOUSING—Muncie Housing Auth., Noel A. Shull, secy., Muncie, A—80 housing units in Whiteley, $955,000; B—270 housing units in Whiteley, $3,223,434; C—250 housing units in Avondale, $3,019,661. CD 9/25/50.

▲† **Ky., Fort Knox**—BUILDINGS, etc.—U. S. Eng., 830 W. Broadway, Louisville, plans by Kennoy, Cammack & Swit, 607 S. Broadway, Lexington, facilities for A F F Bound 2, incl. 3½ mi. water bound macad. roads, 22,000 sq. yd. parking area; installation of doors, heating sys. in 4 shop bldgs.; etc.; plans by Warren Van Praag, Decatur, Ill., 84 buildings, 12 underground rein.-con. magazines, wash racks, roads, utilities; plans by Otis & Grimes, Tyler Bldg., Louisville, Zone 2, 2 story, partial bsmnt., 70x287 ft. Armored Center Academy, 2 story, 230x287 ft. permanent incombustible type bldg., parking areas, utilities; plans by Thos. J. Nolan & Sons, Kentucky Home Life Bldg., Louisville, 2 story, bsmnt., 61x181 ft. permanent incombustible type bldg., utilities, parking areas. $40,000,000. CD 6/27.

▲† **Ky., Lexington**—SHOPS, etc.—U. S. Eng., 830 W. Broadway, Louisville, plans by Frankel & Curtis, Central Bank Bldg., Lexington, nine 36x200 ft. incombustible type shop bldgs., service bldg.; plans by Meriwether Marye & Assoc., 236 E. Short St., Lexington, 100 rein.-con. underground magazines, 81x265 ft. with service drives, 13,000 sq. yd. hard standing for ordnance vehicles, flexible type pavement with bit. surf., utilities at Blue Grass Ordnance Depot, $5,427,100. CD 7/9.

▲† **Ky., Lexington**—CABLE PROCESSING, etc.—U. S. Eng., 830 W. Broadway, Louisville, plans by Frankel & Curtis, Central Bank Bldg., 80x100 ft. incombustible type cable processing bldg.; 80x120 ft. salvage bldg.; 57x124 ft. with 14x30 ft. extension, 3 stall fire station, incl. utilities, roads, drainage at Lexington Signal Depot, $4,595,000.

Ky., Louisville—SCHOOL—Bd. Educ., 506 W. Hill St., plans by D. X. Murphy & Bros., Louisville Trust Bldg., school, 37 and Bonne Sts., $600,000. E. R. Ronald & Assoc., 554 S. 3 St., consult. engrs.

Mass., Braintree—SCHOOL—Town, R. W. Proctor, supt. Schools, 10 Tremont St., plans by Howard L. Rich & Herman F. Tucker, 45 Newbury St., Boston, Lakeside School, Lakeside. $500,000. CD 12/15/50.

† **Mass., Chicopee**—SCHOOL—Purchase & Contracting Office, Bldg. T-297, Westover Air Force Base, plans by Harry J. Tessier, 220 Dwight St., Springfield, school, Proj. Mass 51-c-Fed. 2-A. $644,000.

Mass., Sturbridge, Brookfield and Brimfield—HIGH SCHOOL—Towns of Sturbridge, Brookfield, Brimfield and Wales, plans by Perley F. Gilbert Assoc., 53 Central St., Lowell, regional high school, $750,000.

Mich., Detroit—SCHOOL—City, Bd. Educ., plans by J. Ivan Dise, 2631 Woodward St., Detroit, 2 story, bsmnt. brick Columbus School, 18025 Brock St., $500,000. CD 3/11/43.

Minn., Cottonwood—SCHOOL—Bd. Educ. E. E. Olson, supt. schools, defeated $656,000 bonds Sept. 12. High School and remodel existing bldg. CD 8/29.

Neb., Omaha — SHOP and SERVICE — Omaha Public Power Dist., 17 and Harney Sts., plans by James T. Allan, Brandeis Theatre Bldg., shop and service bldg. addn., 43 and Leavenworth Sts., $675,000. Clarence Minard, c/o owner, ch. engr. CD 3/20.

▲ **N. H., Keene**—HIGH SCHOOL—City, School Bldg. Comm. George Kinsbury, chn., Keene, plans by James A. Britton, 315 Federal St., Greenville, Mass., 1 story masonry Junior School, $1,000,000. CD 8/14/46.

N. C., Henderson—COURT HOUSE, etc.—Bd. Comrs., Vance Co. Henderson, court house and jail. $630,000. CD 12/21/49.

▲ **N. C., Statesville**—HOSPITAL—Bd. Comrs., Iredell Co. $750,000 bond election Oct. 30, 130-bed hospital at Salisbury and imprv. and enlarging Lawrence Hospital at Mooresville, $2,250,000.

O., Defiance—SCHOOLS—Bd. Educ., Defiance, $850,000 bond election Nov. 6, grade school addns. and Defiance High School gymnasium.

▲ **O., Warren**—HOSPITAL—Trumbull Memorial Hospital, 1350 E. Market St., 5 story hospital addn. $2,000,000. Mayer & Valentine, 2036 E. 22 St., Cleveland, consult. engrs. CD 6/22/50.

Pa., Fallsington—SCHOOL—Falls Twp. Auth., Yardley Rd., plans by Micklewright & Mountford, 72 Ewing St., Trenton, N. J., school, in Fairless sect. of Falls Twp. $900,000. CD 7/11.

Tenn., Knoxville—HIGH SCHOOL—Knox Co. Bd. Educ., Knoxville, plans by Barber & McMurray, Kingston Pike, rebuild Gibbs High School. $600,000. CD 1/27/47.

▲ **Tex., Killeen**—HOUSING—Killeen Housing Corp., 1st Natl. Bank Bldg., Killeen, plans by Millam & Roper, 138 Casa Linda Plaza, Dallas, Contrs. 1, 2, 3, 4, and 5, 160 frame dwelling units each, concrete slab fdn. and floors, $880,000 each.

Tex., Kountze—HOSPITAL—Hardin Co., Kountze, plans by W. B. Livesay, Beaumont, 70-bed hospital. $600,000. CD 2/16/50.

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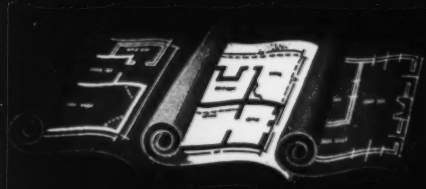

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Tex., Rockwall — HOUSING — Rockwall Housing Auth., Rockwall, plans by Charles B. Mitchell, 2214 Cedar Springs Ave., Dallas, 100 low-rental housing units. $740,000. CD 9/1/50.

Vt., Waterbury—DORMITORY—State, State Bldg. Council, State Office Bldg., Montpelier, plans by Webber & Erickson, 56½ Merchants Row, Rutland, female dormitory for State Hospital. $575,000. CD 1/31/47.

Va., Arlington—COURT HOUSE—Arlington Co., County Court House, bond election Nov. 6, courthouse, $505,000.

▲ **Va., Richmond**—HOSPITAL—State of Virginia, Richmond, construct joint hospital for Negroes at Medical College of Virginia. $4,380,000.

Wash., Aberdeen—HOUSING—Grays Harbor Co. Housing Auth., Aberdeen, 100 housing units. $800,000.

Wash., Auburn—HOUSING—King Co. Housing Auth., 2nd and Pine Bldg., Seattle, Zone 1, plans by V. N. Jones & Assocs. Republic Bldg., Seattle, Zone 1, 60 housing units, $500,000. CD 11/11/49.

Wash., Seattle—SCHOOL—Shoreline School Dist., N. 137 St. and Roosevelt Way, defeated bonds, Woodrow Wilson Junior High School, $800,000. Mallis & De Hart, Lyons Bldg., Seattle 4, Wash., archts. CD 8/21.

Wash., Vancouver—DORMITORY, etc.—State Dept. P. Institutions, Olympia, girls' dormitory, $450,000; vocational training school, $400,000; primary school for girls, $400,000 at Washington State School for Deaf. CD 11/20/46

▲† **Okinawa**—HOUSING—U. S. Eng., (APO 331, c/o PM, San Francisco, Calif., family housing, troop housing, hospital, school, storage and supporting facilities and utilities. $60,466,000.

† **Philippine Islands, Sangley Point**—COLD STORAGE—Dpt. Navy, Bureau Yards and Docks, 18 St. and Constitution Ave. N. W., Wash. 25, D. C., cold storage bldg. at Naval Station. $498,300.

▲† **Philippine Islands, Subic Bay**—DISPENSARY, etc.—Dpt. Navy, Bureau Yards and Docks, 18 St. and Constitution Ave. N. W., Wash. 25, D. C., dispensary, refrigerated storehouse, fencing, lighting, admin. bldg., water sys., drainage and street resurf., at Alava Dock, $5,091,100.

▲† **T. H., Kaneohe**—CAMP—Dpt. Navy, Bureau Yards and Docks, 18 St. and Constitution Ave. N. W., Wash. 25, D. C., camp for one Marine Air Group at Naval Air Station. $4,206,000.

† **T. H., Pearl Harbor**—BUILDING EXTENS.—Dpt. Navy, Bureau Yards and Docks, 18 St. and Constitution Ave. N. W., Wash. 25, D. C., Bldg. No. 9 extensions, welding facilities on repair quays; fire protection extens.; Drydock No. 2, Naval Shipyard. $636,000.

† **T. H., Pearl Harbor**—COMMISSARY STORE—Dpt. Navy, Bureau Yards and Docks, 18 St. and Constitution Ave., N. W. Wash. 25, D. C., commissary store bldg. at Naval Base. $825,000.

▲ **Ont., Brockville**—HOUSES—City, H. W. Carswell, clk., 200 low rental houses under National Housing Act and Ontario Housing Development Act, Approx. $1,200,000.

▲ **Ont., Fort William**—HOUSES—Central Mortgage & Housing Corp., 400 Kensington Bldg., Winnipeg, Man. 200 houses some on west side of C. P. Ry. tracks on Isabella Ridgeway and MacGregor Sts., Approx. $1,400,000. D. W. Laird, c/o owner, engr. CD 1/11/50.

▲ **Ont., North Bay**—HOSPITAL—Dpt. P. Wks., Toronto, plans by J. N. Williams, co owner, 1,200 bed mental hospital. Approx. $6,000,000.

▲ **Que., LaSarre**—HOSPITAL—Province of Quebec, Dpt. Health, Quebec City, hospital. $1,000,000.

Sask., Moose Jaw—DWELLINGS—Municipality, 75 dwellings, Montgomery and Stadacona Sts. etc. $600,000. J. S. Marquis, City Hall, city engr.

▲ **Sask., Saskatoon**—HOSPITAL—Saskatoon City Hospital, Queen and 7 Sts., ratepayers to vote Oct. 31, authorizing 75-bed hospital addn. $1,300,000. Gowan, Ferguson Lindsay, Kaminker, Maw, Langley & Keenleyside, 515 Jarvis St., Toronto, Ont., and Frank Martin, 110 Metropolitan Bldg., Saskatoen, archts. CD 4/13.

COMMERCIAL BUILDINGS

Idaho, Boise—OFFICE—Broadbent Estate, c/o A. K. Tetrick, Sonna Bldg., rebuilding 2nd and 3rd floors on Sonna Bldg. $500,000.

Ill., Chicago—HOME MODIFICATION—Daughters of Zion, N. California and Hirsch Sts., Zone 22, plans by Loewenberg & Loewenberg, 111 W. Monroe St., Chicago, 3, Ill., 4 story, Old Peoples Home modifications. $600,000.

▲ **Ill., Chicago**—MEDICAL DENTAL SCHOOL—Loyola University, 820 N. Michigan Ave., Zone 11, plans by Childs & Smith, 20 N. Wacker Dr., Zone 6, medical-dental school in West Side Medical Center $7,000,000. CD 4/9/45.

▲ **Ill., Chicago**—STORE—John M. Smyth Co., 703 W. Madison St., plans by Mundie Jensen & McClurg, 39 S. LaSalle St., Chicago, 3, Ill., furniture retail store at Monroe and Canal Sts. $3,500,000.

Mass., Northfield—GYMNASIUM—Mount Herman School, President's Office, Northfield, plans by James A. Britton, 319 Federal St., Greenfield, gymnasium addn., $900,000.

N. J., Lawrence Twp.—SHOPPING CENTER—Dunn Field, Inc., 201 N. Sixth St., Camden, shopping center on site of former athletic field, Brunswick Ave. traffic circle (intersection of N.J. Route 26 and Brunswick Ave.) $500,000.

▲ **N. Y., Rego Park**—APARTMENT—Lakeville Northern Blvd. Corp., c/o George Miller, archt., 67 W. 44 St., New York, Zone 18, will not construct 6 story apartment, 99 Rd., between 64 Ave. and 64 Rd. $1,000,000. Project abandoned. CD 3/29.

▲ **O., Shaker Heights**—SHOPPING CENTER—Joseph Laronge Co., Hippodrome Bldg., Cleveland, plans by Weinberg & Teare, Citizens Bldg., Cleveland, 1 story, structural steel, brick shopping center, Kinsman and Warrensville Center Rd. $1,000,000.

▲ **Pa., Abington**—HOSPITAL—Abington Memorial Hospital, Abington, plans by Jack S. Steele Co., 1416 Chestnut St., Phila., hospital addn., alterations. $1,500,000.

Tex., Brenham—HOSPITAL—St. Francis Hospital, Brenham, plans by Walter Butler Co., 1300 Minnesota Bldg., St. Paul, Minn., 3 story 30-bed approx. 327,000 cu. ft. hospital. $600,000.

Tex., Bryan—HOSPITAL—St. Joseph's Hospital, Bryan, plans by Walter Butler, 1300 Minnesota Bldg., Minneapolis, Minn., 3 story masonry hospital annex. $900,000. CD 7/12.

Tex., Houston—RESIDENCES—L. R. Webb, Jr., 8250 Glenbrook Dr., 14 brick residences, concrete slab fdn., air conditioning, in Briarcroft and Memorial Dr. area. $535,000.

▲ **Va., Arlington**—HOTEL—Charles Munson Estate, c/o N. C. Hines, agt., 1418 N. Uhle St., plans by James C. Martinelli, 1164 19 St., N. W., Wash. D. C., 6 story hotel, incl. swimming pool, parking, Columbia Pike and S. Court House Rd. Approx. $3,500,000.

Wash., Bremerton—HOUSES—Hebb & Narodick Constr. Co., 214 Aloha St., Seattle, 62 houses in Anderson Cove area, $600,000.

W. Va., Clarksburg—CHURCH, etc.—First Methodist Church, Clarksburg, plans by Harold Wagner, 117 S. 17 St., Phila., Pa., 1 story, bsmnt., brick, block, church and educational center, $600,000. CD 9/19.

Alaska, Anchorage—HOTEL — Westward Hotel Corp., Anchorage, plans by R. L. Durham & Assoc., 1100 Denny Way, Seattle, Wash., 1 and 2 story frame part bsmnt. hotel. $520,000. CD 9/13.

INDUSTRIAL BUILDINGS

▲ **Ala., Birmingham**—PLANT—Appleton Electric Co., 1713 W. Wellington St., Chicago, Ill., plans by J. E. Sirrine Co., 215 Main St., Greenville, S. C., mfg. plant, $1,000,000. CD 5/15.

▲ **Calif., Torrance**—PLANT—United Rubber Corp., 821 Traction St., Los Angeles, latex rubber manufacturing plant. $2,000,000.

▲ **Ga., Valdosta**—PLANT—Georgia Power Co., 75 Marietta St., Atlanta, electric power plant, $6,000,000. Black & Veatch, 4706 Broadway, Kansas City, Mo., consut. engrs. CD 1/26.

▲ **Ill., Skokie**—FACTORY—Croname, Inc., 3701 N. Ravenswood St., Chicago, Zone 13, plans by Victor L. Charn, 4744 W. Rice St., Chicago, factory. $2,000,000.

▲ **Ill., Seneca**—PLANT—E. I. du Pont de Nemours & Co., du Pont Bldg., Wilmington, Del., altering plant for production of nitric acid, $10,000,000.

▲ **Kan., Ulysses**—PLANT — Hugoyon Production Co., Ulysses, doubling capacity from 70,000,000 cu. ft. to 140,000,000 cu. ft. existing natural gasoline absorption plant. $2,500,000.

▲ **Me., Thomaston**—PLANT—Lawrence Portland Cement Co., 150 Broadway, New York, N. Y., new kiln, plant addn. $1,500,000, F. L. Smidth, 11 W. 42 St., New York, N. Y., consult. engr.

▲ **Minn., Duluth**—REFINERY—International Refineries, Inc., H. M. Baskerville, pres., 227 Colfax Ave. N., Minneapolis, oil refinery to process crude oil from Canada, capacity of 11,500 bbl. daily, Carlton Co., $7,000,000.

▲ **Neb., Omaha**—WAREHOUSE—Sunshine Biscuit, Inc., 29-10 Thompson Ave., Long Island City, N. Y., warehouse, 16 and Fort Sts., $300,000.

▲ **N. C., Charlotte**—PLANT—Lion Oil Co., El Dorado, Ark., anhydrous ammonia plant, near here. $30,000,000. Certificate of Necessity granted.

O., Dayton—FACTORY—Associated Spring Corp., Bristol, Conn., 1 story, 35,000 sq. ft. factory, incl. offices on 30 acre tract, Springboro Pike, east of U. S. 25. $500,000.

▲ **Okla., Tulsa**—RESEARCH CENTER—Stanolind Oil Co., Stanolind Bldg., Zone 2, research center for petroleum products in West Tulsa. $1,000,000. A. L. Solliday, c/o owner, engr. CD 8/4/48.

Pa., Altoona—FACTORY—Altoona Shoe Co., Inc., Altoona, plans by John H. Graham, 2430 Penna Ave. N.W., Wash. D. C. 100x280 ft., brick, steel shoe factory. $520,000.

▲ **Pa., Pittsburgh**—RAILROAD STATION—Baltimore & Ohio R.R., A. C. Clarke, ch. engr., Baltimore and Charles Sts., Baltimore, Md., plans by Hunting, Larsen & Dunnells, Inc., Century Bldg., Pittsburgh, Pa., station and office bldg., Grant and Water Sts. $13,000,000. CD 8/24.

▲ **Tenn., Charleston**—PAPER PLANT—Bowaters Newfoundland Pulp & Paper Mill Ltd., Corner Brook, Newfoundland, news print paper plant, $45,000,000.

▲ **Tex., Abilene**—POWER PLANT—West Texas Utilities Co., Abilene, electric power plant imprvs. and expansion. $1,250,000.

▲ **Tex., Big Lake**—POWER PLANT—West Texas Utilities Co., Abilene, electric power plant imprvs., and expansion. $1,000,000.

▲ **Tex., Corpus Christi**—REFINERY—Sunray Oil Corp., Philtower Bldg., Tulsa, Okla., oil refinery. $10,000,000. Certificate of Necessity granted. C. H. Wright, First Natl. Bldg., Tulsa, Okla., engr.

Tex., Houston—PLANT, etc.—Standard Rice Milling Co., Butler St. and S. P. Ry. tracks, reactivation remodeling, imprvs. and expanding rice milling plant and storage. $750,000.

▲ **Tex., Midland**—PLANT—Magnolia Petroleum Co., Magnolia Bldg., Dallas, natural gasoline extraction plant. $3,500,000.

▲ **Tex., Ozona**—POWER PLANT—West Texas Utilities Co., Abilene, electric power plant expansion. $1,100,000.

Tex., Port Arthur—PLANT—Great Lakes Carbon Corp., 333 N. Michigan St., Chicago 1, Ill., coke plant, $500,000. Ralph H. Decker, 188 W. Washington St., Chicago 2, Ill., consult. engr.

▲ **Tex., San Angelo**—PLANT—West Texas Utilities Co., Abilene, 33,000 watt turbo-generator plant units. $2,750,000.

Tex., Sonora—POWER PLANT—West Texas Utilities Co., Abilene, electric power plant imprvs., expansion $750,000.

▲ **Tex., Texas City**—REFINERY—Texas City Refining Co., Wm. H. Fetter, genl. mgr., Texas City, new refinery units., $1,250,000; general modification of existing refinery units, $1,500,000; storage and shop expansion, pipe lines, $250,000.

▲ **Wash., Mead**—PLANT—Kaiser Aluminum & Chemical Corp., 1924 Broadway, Oakland, Calif., smoke and fume control equipment at aluminum reduction plant, $4,000,000.

▲ **Wis., Milwaukee**—PLANT—Holeproof Hosiery Co., 404 W. Fowler St., plant, $1,500,000.

▲ **Alta., Marlborough**—PLANT—Owner, c/o Minister of Mines Prudham, cement plant near Edson, Edmonton area. Approx. $3,000,000.

▲ **Alta., Red Deer**—MILL—Owner, c/o R. W. Emery, engr., 1 Donino Court, 12, Ont., pulp and paper mill. $20,000,000.

▲ **Que., Lachute**—PLANT—Dominion Shuttle Co., Lachute, Que., plant, Approx. $1,000,000.

UNCLASSIFIED

Fla., Miami—SWIMMING POOLS—City, City Hall, bond election Nov. 27, three swimming pools, $500,000.

▲ † **Md., Annapolis**—STADIUM—U. S. Naval Academy, Annapolis, 150x360 ft. rein.-con., stadium incl. 2 stands, press box for radio and T.V. $2,500,000, L. P. Kooken Co., 46 W. High St., Carlisle, Pa., engr. CD 11/17/47.

Texas—PIPE LINE—Pan American Pipe Line Co., M. Esperson Bldg., Houston, addnl. 36 mi. 14- to 16-in. crude oil pipe line between Arden Station and Eldorado.

▲ **Texas and New Mexico**—PIPE LINE—Texas-New Mexico Pipe Line Co., 702 San Jacinto St., Houston, Tex. 75 mi. 8 in. crude oil pipe line, Midland to Scarborough, Sweetie Peck, Crane, McElroy, Tex., $750,000; 55 mi. 8 in. crude oil pipe line Eunice to Covington and Saunders area, N. M., $525,000.

Tex., Big Lake—POWER LINES—West Texas Utilities Co., Abilene, electric power lines, $500,000.

Va., Arlington—PARKS and PLAYGROUNDS—Arlington Co., County Court House, bond election Nov. 6, acquisition land for parks and playgrounds, $882,000.

▲† **Washington** — TRANSMISSION LINE — Bonneville Power Admin., P.O. Box 3537, Portland, Ore., convert Vancouver-St. Johns transmission line to higher voltage. $2,855,000; enlarge J. D. Ross sub-station, $200,000. CD 2/5.

▲† **Alaska, Kodiak**—FACILITIES, etc.—Dpt. Navy, Bureau Yards and Docks, 18 St. and Constitution Ave. N.W. Wash. 25, D. C., bulk fuel facilities, electronics bldg. station access road, ext. utilities, dredging Women's Bay, power plant, barracks, laundry ext., Naval Operating Base. $7,677,800.

▲† **Alaska, Whittier**—TROOP FACILITIES, etc.—U. S. Eng., (APO 942, c/o PM, Seattle, Wash.) Anchorage, troop supporting facilities and utilities, $5,688,500.

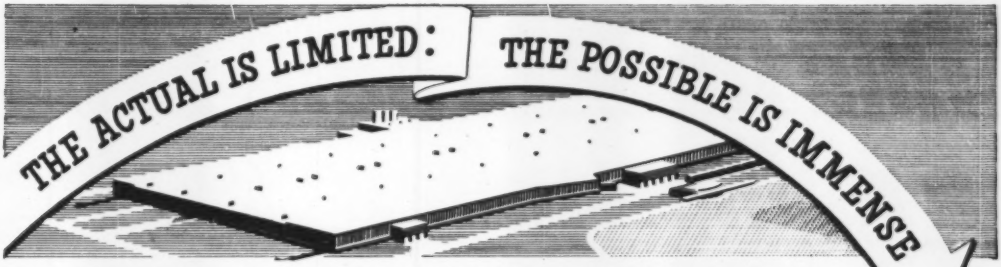
▲† **Cuba, Guantanamo Bay**—PIER—Dpt. Navy, Bureau Yards and Docks, 18 St. and Constitution Ave., N. W. Wash. 25, D. C., ammunition handling pier, road imprvs. and magazine access, Naval Mine and Net Depot. $2,381,500.

▲† **Guam, Marianas Islands**—COMMUNICATION FACILITIES—Dpt. Navy, Bureau Yards and Docks, 18 St. and Constitution Ave., N. W. Wash. 25, D. C., permanent communication facilities, Naval Communications Station. $2,323,350.

† **North Ireland, Londonderry**—FACILITIES—Dpt. Navy, Bureau Yards and Docks, 18 St. and Constitution Ave., N. W. Wash. 25, D. C., addnl. facilities, Naval Communications Facility. $550,000.

▲† **Philippine Islands**—COMMUNICATION FACILITIES—Dpt. Navy, Bureau Yards and Docks, 18 St. and Constitution Ave., N. W. Wash. 25, D. C., consolidated communication facilities, Naval Communication Station. $2,694,500.

▲ **Ontario and Quebec**—PIPE LINE—Trans-Northern Pipe Line Co., 25 Adelaide St. E., Toronto, Ont., constr. pipe line serving Montreal, Que., Ottawa, Toronto and Hamilton, Ont., with products from the refineries at British American, Shell and McColl-Frontenac Oil Companies in Montreal East, Que., main line to be 10 in., 400 miles long, 6 in. branch from Cornwall to Ottawa, 44 mi. long, $50,000,000. CD 7/30.



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WELDED DESIGN SAVES $30,000 ON MULTI-STORY FRAMEWORK

By Van Rensselaer P. Saxe
Engineer
Baltimore, Maryland

IN the recent construction of the 14-story Broadview Apartment in Baltimore, Maryland, welded design saved an estimated $30,000 over what the structure would have cost with riveted construction. By utilizing steel more efficiently, as made possible by welding, and eliminating butt plates and angles, steel requirements for the multiple story framework were cut from 2045 tons to 1960 tons . . . a net saving of 85 tons.

Designed as a rigid frame, beams, columns and girders were shop fabricated at low cost with fast, downhand welding techniques.

Field welds were so engineered as to permit field splices to be welded in downhand positions on most joints.

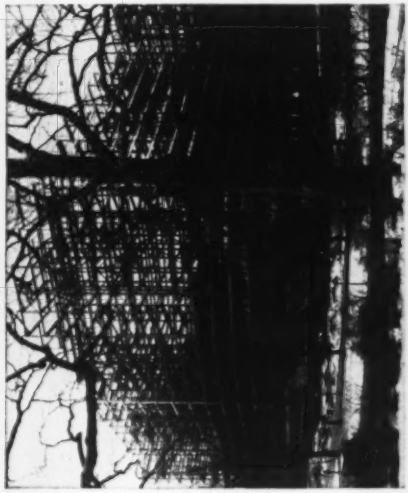

Fig. 3—1960 ton welded steel rigid framework for the 14-story Broadview Apartment, Baltimore, Maryland. Fabricators and Erectors: The Vulcan Rail and Construction Company, Baltimore, Maryland. Architects: Palmer, Fisher, Williams and Nes, Baltimore, Maryland.

WELDED DESIGN ALWAYS SAVES STEEL AND CUTS COST

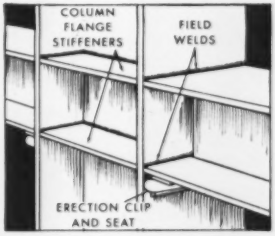

Fig. 1—Typical Beam-to-Column connection, simplified by welding, eliminates costly angles to speed erection.

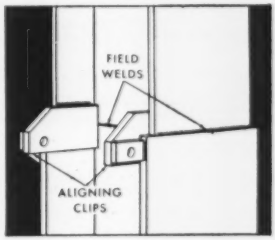

Fig. 2—Column Splice designed to facilitate simple field welding in downhand position.

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GMC Truck & Coach Division of General Motors

CONSTRUCTION REPORTS-Second Section

NEW ENGLAND

BIDS ASKED—HEAVY CONSTRUCTION

STATE HIGHWAY LETTINGS
STREETS AND ROADS
October 16 Massachusetts

BUILDINGS

LOW BIDS AND CONTRACTS

▲ **A. F. Peaslee, Inc.**, 15 Lewis St., Hartford, Conn., LB $1,104,777, Junior-Senior High SCHOOL, S. Main St., CHESHIRE, CONN. Town, Cheshire, Conn. Bids Sept. 18. CD 8/28.

Geo. L. Hickey, Inc., 13 Spring St., Stamford, Conn., CA $576,400, SCHOOL addn., alterations, Glenbrook Rd. and Scofield Ave., STAMFORD, CONN. City, City Hall, Stamford, Conn. Bids Aug. 2, awarded Sept. 25. CD 8/13, under LB.

MIDDLE ATLANTIC

BIDS ASKED—HEAVY CONSTRUCTION

STATE HIGHWAY LETTINGS
BRIDGES
October 26 Maryland
STREETS AND ROADS
October 16 Maryland

BIDS ASKED—BUILDINGS

N. Y., Brooklyn—SCHOOL—B.A. 10/23—Supt. School Bldgs., Design & Constr., 49 Flatbush Ave. exten., Brooklyn, Zone 1, general constr.; plumbing and drainage; heating and ventilating; electrical and lighting fixtures for P. S. 260, Stanley and Williams Aves. Spec. Nos. 67-68-69-70. Plans deposit $15 general constr. $7 each others.

▲ **N. J., Trenton**—HOSPITAL—B.A. 10/30—St. Francis Hospital, Hamilton Ave. and Chambers St., Trenton, hospital addn. $3,000,000. Schmidt, Garden & Erikson, 104 S. Michgan Ave., Chicago, Ill., archts. CD 3/13/50.

SOON LETS CONTRACT—BUILDINGS

Pa., Phila—FACTORY—Budd Co., 2450 Hunting Park Ave., soon lets contracts pickling enclosure factory. Approx. $482,000. CD 10/2.

HEAVY CONSTRUCTION

LOW BIDS AND CONTRACTS

NEW YORK—Bureau Contracts & Accounts, The Governor Alfred E. Smith State Office Bldg., Albany,

Twin Village Constr. Corp., 166 Gould Ave., Depew, N. Y. LB. $100,492, est. $113,000. 2.34 mi. Clarendon-Monroe County Line, Pt. 2, FA.SS. 51-24, S. H. 392, Orleans Co.;

Bero Eng. & Constr. Corp., McKinley Bldg., Buffalo, N. Y. LB. $289,739, est. $290,000. 0.95 mi. Batavia City; Pearl St., Corfu-Batavia, S. H. 8283, FA.C51-4, FA.RC51-37, Genesee Co.;

R. A. Petta Constr. Co., 125 Wilson St., Syracuse, N. Y. LB. $134,895, est. $157,000. 3.19 mi. Scotch Bush-Scotch Church, FA.SS. 51-23, Montgomery Co.; cancelled bids to have been opened Oct 3, imprv. 7.65 mi., New York State Thruway, Ontario Sect., Subdivision 8 and 9; West Henrietta-Rochester S. H. 62; Rush-Henrietta S. H. 1283; East River Rd, Middle Rd., Pinnacle Rd; Henrietta-Pittsford Town Line Rd., OT. 51-7, R.C. 51-71. ST. 51-6, will re-advertise. CD 9/20.

▲ **T. & T. Contr. Co.**, 4814 Glenwood Rd., Brooklyn 3, N. Y., LB. $1,024,205, Contr. 1002-2T-11, trunk sewer line, Malverne to New Hyde Park, MINEOLA, N. Y. Bd. Supervs., Nassau Co., Old Court House, Franklin Ave., Mineola, N. Y. Bids Sept. 25. CD 9/13.

O. H. Hostetter, Builder, Inc., 249 W. Chestnut St., Hanover, Pa., LB. $319,540, sewage treatment plant, GETTYSBURG, PA. Gettysburg Municipal Auth., 141 Baltimore St., Gettysburg, Pa., Bids Sept. 11. CD 8/21.

Armour Excavating, Inc., 7921 Oxford Ave., Phila., Pa., LB. $522,043. water mains, Somerton Sect., PHILA. PA. Dpt. P. Wks., City Hall Annex, Phila., Pa. Bids Sept. 25. CD 9/19.

▲ **Whiting-Turner Contg. Co.**, 305 National Marine Bank Bldg., Baltimore, Md. CA $2,093,883, est. $2,500,000. Part I, Russell St. viaduct, 1,737 ft. length, 89 ft. wide, elevated bridge sect. flanked by earth filled ramps, BALTIMORE, MD. City, Bureau Hys., 303 Municipal Bldg., Baltimore 2, Md. CD 9/19 under LB.

Frank L. Carozza Constr. Co., 511 Park Ave., Baltimore 1, Md. CA $829,415. Install 13,500 ft. 48 in. water main, Druid Lake to Mount Royal Terrace, then to North Ave., North to Lafayette Aves., to Argyle Ave., Dolphin St., Harlem Ave., Schroeder St., Lexington St., Poppleton and to Lombard Sts., BALTIMORE, MD. City, Bureau Water Supply, 503 Municipal Bldg., Baltimore 2, Md. CD 9/19, under LB.

DELAWARE—State Hy. Dpt. Dover,

Wilson Contracting Co., New Castle, Del. CA $689,923. c. conc. wid'n., hot mix resurf. 9.931 mi. Maryland line to State Rd., F. A. Proj. F 21 (6) and F 39 (0), Contr. 1073, New Castle Co. CD 9/26, under LB.

BUILDINGS

LOW BIDS AND CONTRACTS

▲ **Birchwood Garden Homes**, c/o Stanley H. Klein, archt., 89-31 161 St., Jamaica, N. Y., Owner Builds. $1,400,000. 120 one family HOUSES on tract on Front St., EAST MEADOW, N. Y. CD 9/28, under CA.

▲ **Catalina Ranch Homes**, c/o Samuel Paul & Assoc., archts., 163-18 Jamaica Ave., Jamaica, N. Y., Owner Builds. $1,750,000. 117 one family HOUSES, Newbridge Rd., north of Jerusalem Ave., EAST MEADOW, N. Y.

W. W. Kingston, 16 Cannon St., Poughkeepsie, N. Y. CA. Approx. $750,000. SCHOOL, HYDE PARK, N. Y. School Dist. 1, c/o Central School, Hyde Park, N. Y. Bids June 26, awarded Sept. 26. CD 6/12.

▲ **Joseph Bisceglia & Sons**, 227½ Harrison Ave, Harrison, N. Y., CA. $1,287,606, East Lake Grade SCHOOL, E. Lake Dr., MASSAPEQUA, N. Y. Bd. Educ., Union Free School Dist. 23, Massapequa, N. Y. Bids Sept. 21.

▲ **Scarpinato Bros.**, c/o William Sambur, archt., 160-16 Jamaica Ave., Jamaica, N. Y., Owner Builds. $4,500,000. 268 one family HOUSES on tract on East St., NEW HYDE PARK, N. Y.

▲ **Thomas Crimmins Contr. Co. & Arthur A. Johnson Corp.**, 624 Lexington Ave., New York 22, N. Y., CA. $2,168,145, demolition, excavation fdns., and temporary facilities;

General Electric Co., 1 River Rd., Schenectady, N. Y. CA. $9,136,231, main POWER equip. at 74th St. Power Station, NEW YORK, N. Y. Bd. Transportation, 370 Jay St., Brooklyn 1, N. Y.

▲ **Joseph Weinstein, Inc.**, 66 Court St., Brooklyn 2, N. Y. CA. $2,387,000. Junior HIGH SCHOOL 123, Bruckner Blvd. between Stratford and Morrison Aves., Bronx Boro, NEW YORK, N. Y. Bd. Educ., 49 Flatbush Ave. exten., Brooklyn, N. Y. Bids Aug. 21. CD 9/11, under LB.

▲ **Weinstein Constr. Co.**, 573 E. Tallmadge Ave., Akron 10, O., CA. $1,096,300. general constr. HIGH SCHOOL for the Millcreek Twp. School Dist., ERIE, PA. State Public School Bldg. Auth., 1400 N. Cameron St., Harrisburg, Pa. Bids Aug. 23. CD 8/29, under LB.

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Joseph E. Heffernan, Guilford St. and Rowland Ave., Phila., Pa., Separate Contracts. $580,000. RESIDENTIAL DEVELOPMENT, Oak Lane Manor, CHELTENHAM, PA.

Fred Meagher, 225 S. 69 St., Upper Darby, Pa., Separate Contracts. Approx. $300,000. RESIDENTIAL DEVELOPMENT, Buck and Fawn Lanes, HAVERFORD, Pa. James G. Ludwig, 225 S. 69 St., Upper Darby, Pa., archt.

Beaston Constr. Co., 6802 Ludlow St., Upper Darby, Pa., CA. $340,000. RESIDENTIAL DEVELOPMENT, Manoa and Rockwood Dr., HAVERTOWN, PA. Merrihill Corp., 6802 Ludlow St., Upper Darby, Pa.

Townsend & Elfreth, 1601 Chestnut St., Phila., Pa., CA. Approx. $500,000. four steel, masonry INDUSTRIAL bldgs., JENKINTOWN, PA. Standard Pressed Steel Co., Jenkintown, Pa. Richard C. Pullinger, 225 S. 15 St., Phila., Pa., archt. Widdicombe Eng. Co., 117 S. 17 St., Phila., Pa., engr.

Costello Bros., Albion and Stamford Sts., Phila., Pa., Separate Contracts. $300,000. RESIDENTIAL DEVELOPMENT, Martindale St., etc. PHILA., PA. H. Stanley Atkinson, 10 S. 18 St., Phila., Pa., archt.

Forrest-Stewart Co., 8020 York Rd., Elkins Park, Pa., Separate Contracts. Approx. $300,000. RESIDENTIAL DEVELOPMENT, Thouron and Upsal Sts., PHILA., PA. Lewis J. Cowan, 1505 Pine St., Phila., Pa., archt.

Franklin Constr. Co., Market St. Natl. Bank, Phila., Pa., CA. $500,000. APARTMENT DEVELOPMENT, Chew Ave. and Washington Lane, PHILA., PA. Franklin Park, Inc., Market St. Natl. Bank, Phila., Pa. Knopf & O'Shiver, 1704 Walnut St., Phila., Pa., archts.

Spring-Dell Corp., 7060 Garrett Rd., Upper Darby, Pa., CA. $500,000. RESIDENTIAL DEVELOPMENT, Scenic and Midland Rds., SPRINGFIELD, PA. Parkside Corp., 8060 Garrett Rd., Upper Darby, Pa.

McCloskey & Co., 1620 W. Thompson St., Phila. 21, Pa., CA. $869,500. general constr. HIGH SCHOOL addns. for Nether Providence Twp. School Dist., WALLINGFORD, PA. State Public School Bldg. Auth., 1400 N. Cameron St., Harrisburg, Pa. Bids Aug. 30. CD 9/5, under LB.

▲ **Baltimore Contractors, Inc.,** 711 S. Central Ave., Baltimore, Md. CA $3,444,600. rebuild existing 3 story, 7x674 ft. bldg. into 5 story INFIRMARY, Baltimore City Hospital, BALTIMORE, MD., City Bureau Bldg. Constr., R. E. L. Williams, engr., 410 Municipal Bldg., Baltimore, Md. CD 9/27, under LB.

▲ **Catocin Estates-Earl F. Hargett,** 21 Frederick Ave., Frederick, Md. Owner Builds. $2,300,000. 140 masonry frame RESIDENCES, Biggsly and Taney Aves., FREDERICK, MD.

SOUTH

BIDS ASKED—HEAVY CONSTRUCTION

STATE HIGHWAY LETTINGS

BRIDGES

October 7 Louisiana — October 19 Kentucky

STREETS AND ROADS

October 7 Louisiana — October 19 Kentucky

▲ N. C., Asheville—B.A. 11/1—City, North Fork Dam for water supply, $2,500,000. Charles T. Main, Inc., 80 Federal St., Boston, Mass., engr. CD 5/17.

HEAVY CONSTRUCTION

LOW BIDS AND CONTRACTS

Aaron J. Conner, Rte. 2—Box 54, Roanoke, Va., LB. $537,300. sewage treatment plant, HARRISONBURG, VA. City, Harrisonburg, Va. Bids Sept. 26. CD 9/5.

† **Shaw & Estes,** 1407 S. Akard St., Dallas, Tex., LB. $598,409. Turbo-propr engine test cells, U. S. Naval Air Station, NORFOLK, VA. Pub. Wks. Office, Fifth Naval Dist., U. S. Naval Base, 11, Norfolk, VA. CD 8/17.

▲† **Paul Teagarden,** Box 212, Columbus, Ind., CA $1,932,520. runway, taxiway and apron paving at Patrick Air Force Base, COCOA, FLA. U. S. Eng., 575 Riverside Ave., Jacksonville, Fla. Bids Sept. 25. CD 10/2, under LB.

LOUISIANA—State Hy. Dpt., Highway Office Bldg., Baton Rouge,

Flenniken Constr., Co., Lake Charles, La. CA $612,681. asph. 13 mi. State Rte. 104, Houston River-De Quincy Hy., Calcasieu Parish. CD 9/12, under LB.

BUILDINGS

LOW BIDS AND CONTRACTS

Thorington Constr. Co., 205 E. Canal St., Richmond, Va., CA. $527,700. Construct Southeastern Elementary SCHOOL, NORFOLK, VA. Norfolk Co., Portsmouth, Va. Bids Sept. 14. CD 9/24, under LB.

J. A. Jones Constr. Co., 209 W. 4 St., Charlotte, N. C. CA. $907,000. CLASSROOM bldg., DURHAM, N. C. Duke University, Durham, N. C. CD 9/28, under LB.

▲ **Charleston Co.,** Charleston, S. C. rejected bids June 6, Tuberculosis HOSPITAL, L.B. $1,279,713. CHARLESTON, S. C. CD 6/14, under LB.

Veterans Loan & Realty Co., 318 9th St., Augusta, Ga., Owner Builds. Approx. $600,000. 75 HOMES, NORTH AUGUSTA, S. C.

Lanoco Constr. Co., 126 24 St., Miami Beach, Fla., CA Approx. $500,000, HOTEL, CORAL GABLES, FLA. Ponce DeLeon Blvd. Hotel, c/o contractor.

(Continued on page 120)

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(Continued from page 118)

Beeler & Higgs, Box 5206, Jacksonville, Fla., CA $564,747, high SCHOOL, GREEN COVE SPRINGS, FLA. Clay Co. P. P. Instruction, Green Cove Springs, Fla. Bids Sept. 17. CD 8/29.

▲ **Henry C. Beck Co.**, First National Bank Bldg., Atlanta, Ga. CA, $1,038,150, Project Fla 18-2, 140 HOUSING units, PANAMA CITY, FLA. Panama City Housing Auth., Panama City, Fla. Bids Sept. 20. CD 9/26, under LB.

T. Miller & Sons, P.O. Box 921, Lake Charles, La. CA $643,707. rebuild HIGH SCHOOL, LAKE CHARLES, LA. Lake Charles School Bd., Lake Charles, La. Bids Sept. 28. CD 9/6.

Farnsworth & Chambers Co., Inc., P.O. Box 74, Houston, Tex. CA $887,605. Taylor Park Uptown Negro Elementary SCHOOL, NEW ORLEANS, LA. Orleans Parish School Bd., 703 Carondelet St., New Orleans, La. CD 9/25, under LB.

Keller Constr. Corp., 7900 Palm St., New Orleans, La. LB $720,000. Union Park Elementary SCHOOL, NEW ORLEANS, LA. Orleans Parish School Bd., 703 Carondelet St., New Orleans, La. Bids Sept. 27. CD 8/17.

Holston Methodist Home, c/o Barber & McMurray, archts., 2405 Kingston Pike, Knoxville, Tenn., rejected bids Aug. 31, ADMINISTRATION-CHAPEL bldg., GREENVILLE, TENN. L. B. $496,591. CD 9/14, under LB.

MIDDLE WEST

BIDS ASKED—HEAVY CONSTRUCTION
STATE HIGHWAY LETTINGS
BRIDGES
October 16 Indiana
STREETS AND ROADS
October 16 Indiana

BIDS ASKED—BUILDINGS

† **Ill., Rock Island**—BUILDING—B.A. 10/19—Dpt. Army Pentagon Bldg., Wash., 25, D. C., modification 230x520 ft., steel frame bldg. at Rock Island Ordnance Plant, and constr. additional facilities, $400,000 CD 7/3, under Unclassified.

▲ **Ill., Des Plaines**—SCHOOL, etc.—B.A. 10/22—Maine Township High School, Dempster and Potter Sts., high school and gymnasium addn., $2,500,000. Childs & Smith, 20 N. Wacker Dr., Chicago 6, Ill., archts. CD 11/16/49.

Ind., South Bend—SCHOOL—B.A. 10/22—Bd. School Trustees, R. R. Walker, secy., 228 S. St. Joe St., 2 story, bsmnt., 68x299 ft. Pierre Navarre School and 1 story, 72x86 ft. gymnasium all brick, stone, rein.-con. $975,000. N. Roy Shambleau, 621 J. M. S. Bldg., archt.

HEAVY CONSTRUCTION

LOW BIDS AND CONTRACTS

▲**ILLINOIS**—State Div. Hys., Springfield,
M. Hoeffken Co. and Hoeffken Bros., Inc., 22 W "B" St. Belleville, Ill., LB, $236,847, variable width c. conc. base course and wid'n. 10.29 mi. Ill. 12 St. Clair Co.; LB $1,585,576, c.conc. 8.77 mi. Ill. 3, Randolph Co.;
Jefferson Asphalt Co., 1209 Casey St., Mount Vernon, Ill., LB, $102,689, intermittent bit. resurf. 3.31 mi. Ill. 37 and 143, Hamilton and Franklin Counties;
Dale Denny Constr. Co., 507 S. Green St., Anna, Ill., LB $345,645, bit. on gravel or crushed stone base course 4.96 mi. Ill. 937, Massac Co.;
S. M. H. Constr. Co., 1500 N. Adams St., Peoria, 3, Ill., LB $721,339, c.conc. 1.69 mi. Ill. 88, Peoria Co.;
Walsh Oil Co., N. Broadway, Joliet, Ill., LB, $463,511 bit. resurf. 15.78 mi. Ill. 77, Will Co.;
Municipal Paving Co., 717 Thomas St., Oak Park, Ill., LB $61,953, bit. resurf. 0.9 mi. Ill. 98, Chicago, Cook Co.;
E. A. Meyer Constr. Co., 1539 Morrow Ave., North Chicago, Ill. LB $443,506 c.conc. 0.95 mi. Ill. 99, Lake and Cook Counties;
Bituminous Fuel & Oil Co., 509 First National Bank Bldg., East St. Louis, Ill., Lb, $135,214, intermittent bit. resurf. 2.48 mi. Ill. 2, 3, 13 and 150, Jackson, Perry, Union, Randolph and Washington Counties;
Trompeter Constr. Co., 2428 48 St., Peru, Ill., LB $338,035, c.conc. 1.28 mi. on Ill., 7, La Salle Co.;
Chatham Paving Co., 8452 S. State St., Chicago, 19, Ill., LB, $121,310, c.conc. wid'n. 8.36 mi. Ill. Route 55 and 56, Cook and DuPage Counties;
Orr Constr. Co., 27 E. 19 Pl., Chicago Heights, Ill., LB, $221,778, variable width c.conc. base course and wid'n. 16.11 mi. Ill. 1, Kankakee and Iroquois Counties.
Edwardsville Constr. Co., 309 Bank of Edwardsville, Bldg., Edwardsville, Ill., LB $226,926, c. conc. 1.15 mi. and one culvert Ill. 4, Greene Co.;
R. A. Cullinan & Sons, Inc., Tremont, Ill., LB $73,596 bit. 3.86 mi. Ill. 46, Tazewell Co.;
H. H. Hall Constr. Co., 211 S. 15 St., East St. Louis, Ill., LB, $75,805. grading 1.16 mi. and 1 bridge on Ill. 749, Jersey Co.;
Powers-Thompson Constr. Co., 27 S. Chicago St., Joliet, Ill., LB, $131,540, c.conc. 0.91 mi. Ill. 23, Will Co.
Black Top Roads Co., 1929 N. Narragansett St., Chicago, 39, Ill., Lb, $68,031, c.conc. base course wid'n., and bit. resurf. 1.46 mi. Ill. 55, Du Page Co.
Maclair Asphalt Co., Inc., 6000 Collinsville Rd., East St. Louis, Ill., LB, $89,104, c.conc. base course wid'n., resurf. 2.04 mi. Ill. 151, St. Clair and Madison Counties. Bids Sept. 28. CD 9/14 and 9/19.

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▲ Michael Pontarelli, 4248 N. Kilpatrick St. Chicago, 41, Ill., CA, $1,981,050, Harms Road Interceptor Sewer, CHICAGO, ILL. Sanitary Dist. of Chicago, 910 S. Michigan Ave., Chicago, 5, Ill. Bids Aug. 23, awarded Sept. 24.

▲† Lieb Brothers, Inc., 110 McCarter Hy. Newark, N. J. CA, $13,501,275., addnl. facilities, Schedule 1, airmen's dormitory, mess and admin., grading, paving, utilities, flood control imprvts.; Schedule 2, bachelor officers quarters, WAF officers, academic bldgs., mess bldg., grading, paving, utilities; Schedule 3, lighting system, electrical distr. system; Schedule 4, airfield and roadway paving, etc. Schedule 5, alert hangar, readiness hangar, readiness bldg., landing system and I.F.R. room. Schedule 6, aircraft fueling system, SCOTT AIR FORCE BASE, ILL. U. S. Eng., 502 Merchandise Mart, Chicago, 54, Ill. Bids Sept. 7. CD 9/28, under LB.

BUILDINGS

LOW BIDS AND CONTRACTS

▲ Ben Apelbaum & Sons, 163 E. Market St., Akron, O., Owner Builds, $2,000,000, 150x800 ft. SHOPPING CENTER, for 40 stores, on Wooster Rd. N., between Hoporan and Tuscarawas Aves., BARBERTON, O.

Robert Blum Constr Co., 203 N. Wabash St., Chicago, 1, Ill., CA, $300,000, STORE, GARAGE and BOWLING ALLEYS on site of former Chicago Public School, CHICAGO, ILL. West Suburban Home Builders, Inc., 105 W. Monroe St., Chicago, 3, Ill. Irving M. Karlin, 203 N. Wabash St., Chicago, 1, Ill., archt. Awarded Sept. 26.

Lee Constr. Co., 127 N. Dearborn St., Chicago, 2, Ill. LB, $365,000, 2 story, Eugene Field Grade SCHOOL, PARK RIDGE, ILL. School Dist. 64, 222 Lincoln St., Park Ridge, Ill. Bids Oct. 1.

▲ Corbetta Constr. Co. and Price Bros., Co., 208 S. Lasalle St., Chicago, 4, Ill., CA, $5,000,000, construct, manage and finance, 1,000 additional HOUSING units for Navy Personnel at Great Lakes Training Center, GREAT LAKES, ILL. Ninth Naval Dist., Naval Training Center, Great Lakes, Ill. Shaw, Metz & Dolio, 208 S. La Salle St., Chicago, 4, Ill., archts. Awarded Sept. 28.

Coath & Goss, 5130 W. Lake St., Chicago, 44, Ill., LB, $570,000, 1 and 2 story, bsmnt., Stewart SCHOOL PARK RIDGE, ILL. School Dist. 64, 222 Lincoln St. Park Ridge, Ill. Bids Sept. 27.

L. G. Arnold, Inc., 2011½ Dewey St., Eau Claire, Wis., LB, $487,617, general contract, COURT HOUSE and JAIL, EAU CLAIRE, WIS. Eau Claire Co., Eau Claire, Wis. Bids Sept. 12. CD 8/20.

WEST OF MISSISSIPPI

BIDS ASKED—HEAVY CONSTRUCTION

STATE HIGHWAY LETTINGS

BRIDGES

October 19 Kansas, Minnesota

STREETS AND ROADS

October 16 Iowa — October 19 Kansas, Minnesota

▲ Texas, Kansas, Illinois—PIPE LINE—Bids Asked—Phillips Pipe Line Co., Bartlesville, Okla., 137 mi. 10 in. products pipe line, Paola, Kan. to East St. Louis, Ill., $2,466,000; 69 mi., 12 in. products pipe line, Wichita to Paola, Kan., $1,550,000. CD 7/3.

BIDS ASKED—BUILDINGS

▲ Kan., Manhattan—HOSPITAL—B.A. 10/10—Riley Co., hospital, $1,100,000. F. O. Wolfenbarger, Manhattan, archt. CD 7/25/47.

▲ Tex., Corpus Christi—REFINERY—Bids Asked—Sunray Oil Corp., c/o F. L. Martin, pres., Jones Bldg., catalytic cracking refinery, mfg. primarily aviation gasoline, $12,000,000. CD 9/27.

HEAVY CONSTRUCTION

LOW BIDS AND CONTRACTS

▲† S. Patti Constr. Co., 1340 Admiral St., Kansas City, Mo., CA $1,429,409., bulk petroleum storage facilities, KCM 52-1, PARKVILLE, MO. U. S. Eng., 601 Davidson Bldg., Kansas City 8, Mo. Awarded Sept. 24. CD 9/27, under LB.

▲† NORTH DAKOTA—U. S. Eng., P.O. Box 300, Bismarck.

Massman Constr. Co., 20 W. 9 St., and Kansas City Bridge Co., 926 Broadway, both Kansas City, Mo., LB, $1,915,892. substructure for highway bridge crossing of Missouri River Inv. 52-10, Mountrail and McKenzie Counties. Bids Sept. 21. CD 8/24.

Douglas Contractors, Keeline Bldg., Omaha, Neb., CA, $715,402. 710 mi. rural distr. lines, Haakon, Jackson, Jones and Stanley Counties, SOUTH DAKOTA. West Central Electric Co-operative, Murdo, S. D. Bids Sept. 18. CD 9/26, under CA.

Carrothers Constr. Co., Paola, Kan., LB, $910,115. water supply sys., Inv. 52-18, CHAMBERLAIN, S. D. U. S. Eng., 1709 Jackson St., Omaha, Neb. Bids Sept. 20. CD 9/6.

Earl W. Baker & Co., Bethany, Okla., CA, $718,519. est. $837,849. sanitary main sewers, Contr. 14B, OKLAHOMA CITY, OKLA., Benham Eng. Co., American Natl. Bldg., Oklahoma City, Okla., engrs. Awarded Sept. 18.

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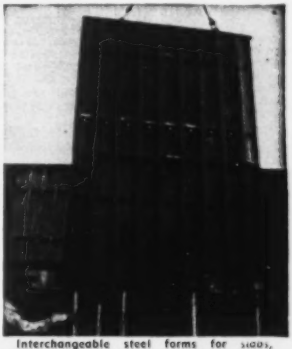

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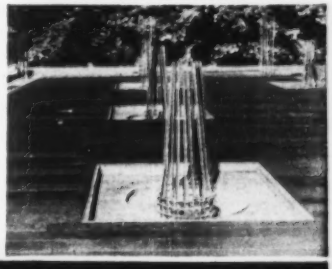

IRVINGTON FORM & TANK CORP.
20 Vesey St. New York 7, N. Y.

LABOR-SAVING *SPEED* FORMS

Rancho Pipe Line System, c/o Shell Pipe Line Corp., Shell Bldg., Houston, Tex. Own Forces. Approx. $480,000. 66 mi. 8 in. crude oil pipe line between LaGrange and Gollke west, TEXAS. CD 7/25.

▲ **United Gas Pipe Line Co.,** 1525 Fairfield Ave., Shreveport, La., Owner Builds. Approx. $2,375,000. 44 mi. 20 in. gas pipe line between Houston and Orange, TEXAS. CD 7/31/50.

MONTANA—State Hy. Dpt., Capitol Bldg., Helena.

McKinnon-Decker Constr. Co., Helena, Mont. CA $198,448, grav. 6.889 mi. Drummond-Helmville Rd., Powell Co.; CA $205,002, grav. surf. 2.076 mi. Bearmouth-Deer Lodge Rd., Powell Co.;

Glen Geary, Missoula, Mont., CA $402,052, grav., bit. surf. 6.345 mi. Bearmouth-Deer Lodge Rd., Powell Co. Grand total $805,502. Bids Sept. 27. CD 9/19.

† **Birch, McLaughlin & Lane,** Ford Bldg., Great Falls, Mont. LB $748,463, aircraft refueling sys., addns. to bulk fuel storage at Great Falls Air Force Base, Eng. 45-164-5-7. GREAT FALLS, MONT. U. S. Eng., Bldg. 602, City-County Airport, Walla Walla, Wash. Bids Sept. 26. CD 9/11.

† **McGinnes Bros. Inc.,** 5619 Griggs Rd., Houston, Tex., CA $940,115, channel clearing on Rio Grande River from San Martial to above Elephant Butte Reservoir, dike constr., floodway preparation, NEW MEXICO. Bureau Reclamation, Dpt. Interior, Bldg. 1A, Denver Federal Center, Denver, Colo. Bids Aug. 30, awarded Sept. 26. (Correction—contractor). CD 9/18, under CA.

▲ **NEW MEXICO**—State Hy. Comn., Capitol Bldg., Santa Fe.

D. D. Skousen, Springer Bldg., Albuquerque, N. M., LB $308,838, Proj. No. FI-91 (10), between Springer and Colmor, Colfax Co.;

Brown Contg. Co., 3525 N. 4 St., Albuquerque, N. M., LB $288,094, Proj. N1. F-132 (5), between Artesia and Carlsbad, Eddy Co.; LB $118,656, Proj. No. S-143 (2), between Lordsburg and Animas, Hidalgo Co.;

G. I. Martin, 400 S. California St., Albuquerque, LB $125,195, Proj. No. S-95 (1), northeast of Roswell, Chaves Co.; LB $316,222, Proj. No. S-201 (7), Bloomfield and Blanco, San Juan Co.;

O. D. Cowart, 523 S. Amherst Ave., Albuquerque, N. M., LB $98,508, Proj. No. S-197 (1), east of Deming, Lincoln Co. Bids Sept. 28. CD 9/19.

BUILDINGS

LOW BIDS AND CONTRACTS

† **Sam Dasta & Son Co.,** Railway Exchange, Kansas City 6, Mo. CA $409,877, 80,000 sq. ft. WAREHOUSE at Lake City Arsenal, Inv. 52-11, INDEPENDENCE, MO. U. S. Eng., 601 Davidson Bldg., Kansas City 8, Mo. Bids Sept. 24, awarded Sept. 25. CD 9/14.

Omaha Public Power Dist., 17 and Harney Sts., Omaha, Neb. Owner Builds. $675,000. SHOP and SERVICE Bldg. addn., 43 and Leavenworth Sts., OMAHA, NEB. CD 9/26.

Bunt Warren, 112 E. Madison St., Iola, Kan. and **Vern Peterson,** 522 N. Tennessee St., Iola, Kan. Owner Builds. $300,000. 29 DWELLINGS, IOLA, KAN.

▲ **Bowers Constr. Co.,** 627 College St., Topeka, Kan. Owner Builds. $1,500,000. 150 DWELLINGS, TOPEKA, KAN.

▲ **Sanneman Bros. Constr. Co.,** 123 E. 21 St., Topeka, Kan. Owner Builds. $1,000,000. 100 DWELLINGS, TOPEKA, KAN.

▲ **Utah Constr. Co.,** N. Salt Lake City, Utah. CA $3,166,271, PLANT expansion, CORPUS CHRISTI, TEX. American Smelting & Refining Co., Shell Rd., Corpus Christi, Tex. CD 10/2, under LB.

Texas Gulf Constr. Co., Box 661, Houston, Tex., CA $557,985, est. $492,000, general SCHOOL bldg. improv. program, GOOSE CREEK, TEX. Goose Creek Independent School Dist., Baytown, Tex. Bids Sept. 20. CD 9/25, under LB.

Lima-Hamilton Corp., 1805 N. Industrial Blvd., Dallas, Tex., LB $448,070, electric GENERATING UNIT, auxiliaries, and equipment, GREENVILLE, TEX. City, Greenville, Tex. Bids Sept. 25. CD 8/30.

Farnsworth & Chambers, Inc. Box 74, Houston, Tex., CA. Approx. $660,000. 2 story, bsmnt., 101x104 ft., structural steel, brick, limestone, OFFICE, concrete pier and beam fdn., HOUSTON, TEX. Main-Tex Corp., 1st. Natl. Bank Bldg., Houston, Tex. CD 4/16.

C. W. Hickman, 6716 Hempstead Rd., Houston, Tex., Own Forces. $510,000. Unit 1, 75 DWELLINGS, HOUSTON, TEX. CD 9/20.

▲ **Tellepsen Constr. Co.,** 1710 Telephone Rd., Houston, Tex., CA. Approx. $1,225,000. 4 story, 100-bed masonry childrens HOSPITAL, HOUSTON, TEX. Lee C. Gammill, 210 Emerson St., Houston, Tex. CD 8/31/50.

L. R. Webb, Jr., 8250 Glenbrook St., Houston, Tex., Force Account. Approx. $535,000. 14 RESIDENCES, HOUSTON, TEX. CD 9/27.

FAR WEST

BIDS ASKED—HEAVY CONSTRUCTION
STATE HIGHWAY LETTINGS
STREETS AND ROADS

October 19 Idaho **October 24 California**

▲ **Calif., Los Angeles**—B.A. 10/22—Los Angeles Dpt. Water & Power, 207 S. Broadway, Eagle Rock—Hollywood Conduit Units 1 and 2, $6,000,000. S. B. Morris, ch. engr. CD 1/15/45.

▲ † **Wash., Copalis**—RADIO STATION—B.A. 10/31—Officer of Public Affairs, State Dpt., 21 St. and Virginia Ave. N. W., Wash. 25, D. C., design, construction, installation and testing of high frequency radio station for Voice of America, $5,000,000. CD 9/17, under Wash., Aberdeen.

BIDS ASKED—BUILDINGS

Wash., Bethel—SCHOOL—B.A. 10/18—School Dist. 403, Bethel, 60,500 sq. ft., rein.-con., masonry high school, $775,000. Plans deposit $40, Rueger & Reuger, 15 N. Broadway, Tacoma, archts. CD 6/26.

HEAVY CONSTRUCTION

LOW BIDS AND CONTRACTS

NEVADA—Directors Dpt. Hys., State Office Bldg., Carson City.

Isbell Constr. Co., S. Virginia Rd., Reno, Nev., CA. $530,136, construct portion of State Hy. System, from Sparks to Vista, Proj. No. FI-001-1 (3), Control Sects. WA-02 and WA-03, Rte Sect. 001-1, State Hy. Contr. No. 807, Washoe Co. Bids Sept. 27. CD 9/17.

Osberg Constr. Co., 1132 N. 128 St., Seattle, Wash., LB, $501,225, clearing Ross Reservoir, SEATTLE, WASH. City, County-City Bldg., Seatle, 4, Wash. E. R. Hoffman, city light supt. CD 12/30/43.

State Constr. Co., 1750 19th Ave. S. Seatle, Wash., and **Walter McCray,** 308 S. W. 22 St., Mercer Island, Wash., LB, $682,725, Willamette River Crossing, City Sewer Proj., PORTLAND, ORE. City, City Hall, Portland, Ore. Bids Sept. 24. CD 9/12.

▲ **CALIFORNIA**—State Div. Hys., P. Wks. Bldg., Sacramento.

A. G. Raisch Co., Box 468, San Rafael, and **Lew Jones Constr. Co.,** 1535 S. 10 St., San Jose, Calif., CA, $1,059,979 highway, ramps, frontage road, hy. roadbeds, place plant mix surf. wid'n. rein.-con. bridge, constr. rein.-con. bridge, and installing hy. lighting facilities, between Myrtle Ave. in San Rafael, via Park Overhead, Marin Co. Bids Sept. 12, awarded Sept. 24. CD 9/10, under LB.

▲ **CALIFORNIA**—State Div. Hys., 120 S. Spring St., Los Angeles,

J. A. Payton, Box 207, Riverside and Bent Constr. Co., 5359 Valley Blvd., Los Angeles, Calif., CA, $1,618,804, grading, paving, grade separation structures 2.1 mi. Buena Vista Lagoon and 1.4 mi. south of Mission Ave., Oceanside, San Diego Co. Bids Sept. 6, awarded Sept. 25. CD 9/17, under LB.

CALIFORNIA—State Div. Hys., P. Wks. Bldg., Sacramento,

Tublin Co., 1700 19 St., Bakersfield, Calif., LB $132,905, rein.-con. box girder bridge across Mokelumne River 4 mi. south of Jackson, Amador and Calaveras Counties. Bids Sept. 26. CD 9/10.

▲ **CALIFORNIA**—State Div. Hys., 120 S. Spring St., Los Angeles,

Griffith Co., 1016 S. Broadway, Los Angeles, Calif., CA. $2,381,815, grading, paving 1.7 mi., constr. 4 bridges and pedestrian undercrossing on Ramon Freeway between 8 St. and 1 mi. east of Jackson Ave., Los Angeles Co. Bids Sept. 6. CD 9/11, under LB.

† **CALIFORNIA**—Bureau P. Rd., Dpt. Commerce, 1101 Flood Bldg., San Francisco,

Geo. R. Patterson, P.O. Box 2004, Stockton, Calif., LB, $493,075, grading, draining, surf. 3.79 mi. Beegum-Peanut Road, Trinity National Forest, Trinity and Shasta Counties. Bids Sept. 25. CD 9/12.

McGuire & Hester, 796 66 Ave., Oakland, Calif., CA, $531,766, grading, surfacing, sanitary and storm sewers, water mains, etc. Assessment Dist. 4 ANTIOCH, CALIF. City, City Hall, Antioch, Calif. Bids Sept. 25, awarded 9/26.

J. & B. Constr. Co., 5572 Valley Blvd., Los Angeles, Calif., CA, $119,900, warehouse and office bldg. for maintenance area at Los Angeles International Airport, LOS ANGELES, CALIF. Dpt. Airports, 5800 Avion Dr., Los Angeles, Calif. Bids Aug. 9. CD 5/16/45.

The Snyder Engineering Corp., 2336 E. 52 St., Los Angeles, Calif., CA, $109,982, fertilizer pelleting system at Hyperion Activated Sludge Plant, El Segundo, LOS ANGELES, CALIF. City, City Hall, Los Angeles, Calif. Bids Aug. 22. CD 11/18/48.

E. J. Tobin, 1000 Carleton St., Berkeley, Calif. LB $179,855, storm drains under Improvement Proj. 195-12, MENLO PARK, CALIF. City, City Hall, Menlo Park, Calif. CD 4/17/50.

▲† **Carl N. Swenson Co., Inc.,** 1095 Stockton Ave., San Jose, Calif., LB, $1,033,781, foundations for 8 ft. supersonic wind tunnel Spec. A-6750, MOFFETT FIELD, CALIF. National Advisory Comm. for Aeronautics Ames Laboratory, Mcffett Field, Calif. Bids Sept. 25. CD 9/12.

BUILDINGS

LOW BIDS AND CONTRACTS

Hebb and Narodick Constr. Co., 214 Aloha St., Seattle, Wash. Day Labor $600,000, 62 HOUSES in Anderson Cove area, BREMERTON, WASH. CD 9/24.

† **L. H. Hoffman,** 715 S.W. Columbia St., Portland, Ore., CA, $533,500, LIBRARY and FILES BLDG. and BADGE HOUSE at Hanford Works, RICHLAND, WASH. Atomic Energy Comn., 1901 Constitution Ave. N.W., Wash., D. C. CD 8/3, under LB.

Francies Constr. Co., P.O. Box 935, Santa Rosa, Calif., CA, $458,000, Fort Bragg Elementary SCHOOL, Chestnut and Lincoln Sts., FORT BRAGG, CALIF. Fort Bragg Union Elementary School Dist., Harold St., Fort Bragg, Calif. Bids Sept. 25.

C. E. DeWitt, 11379 San Fernando Rd., San Fernando Rd., Calif., CA, $514,942, Park View SCHOOL addns., LANCASTER, CALIF. Lancaster Elementary School Dist., Lancaster, Calif. H. L. Gogerty, 3123 W. 8 St., Los Angeles, Calif. archts.

▲ **Kenbo Corp.,** 117 E. Colorado St., Pasadena, Calif., Owner Builds, $1,040,400, 131 frame, stucco DWELLINGS in Tract 13704, LOS ANGELES, CALIF. Burge & Roach, 510 Knight Way, La Canada, Calif., archts.

Wm. P. Neil Co., 4814 Loma Vista St., Vernon, Calif., CA. Approx. $500,000, 300x300 ft., concrete steel FACTORY, LOS ANGELES, CALIF. American Brake Shore Co., 5309 E. Slauson St., Los Angeles, Calif.

Bayshore Constr. Co., 744 Folger Ave., Berkeley, Calif., LB, $455,880, steel, concrete WAREHOUSE, 59 and R Sts., SACRAMENTO, CALIF. Sacramento Municipal Utility Dist., 2101 K St., Sacramento, Calif. Bids Sept. 11. CD 9/4.

Bethlehem Pacific Coast Steel Corp., Box 3494, Rincon Annex, San Francisco, Calif., LB, $333,253, structural steel work for 1 story, part mezzanine State PRINTING PLANT, SACRAMENTO, CALIF. State Div. Architecture, P. Wks. Bldg., Sacramento, Calif. Bids Sept. 25. CD 8/28.

Baringer & Botke, 333 Riverside Dr., Santa Paula, Calif., CA, $357,800, reinforced brick MARKET, SANTA PAULA, CALIF. Safeway Stores, Inc., 5851 S. Broadway, Los Angeles, Calif. W. M. Bostock, 8414 Otis St., South Gate, Calif., engr.

ALASKA

HEAVY CONSTRUCTION

LOW BIDS AND CONTRACTS

† **U. S. Eng.,** (APO 942, c/o PM, Seattle, Wash.) Anchorage, Alaska, cancelled bids to have been opened Oct. 30, airmens service club, Inv. S95-507-52-18; 1,000 seat capacity theater with stage, Inv. S95-507-52-19 at Eielson Air Force Base, ALASKA. CD 10/2.

U. S. POSSESSIONS

HEAVY CONSTRUCTION

LOW BIDS AND CONTRACTS

▲† **Hato Rey Building Co.,** P. O. Box 172, Hato Rey, Puerto Rico, CA, $1,533,759, compass swinging base, hardstands and taxiway lighting at Ramey Air Force Base, AQUADILLA, PUERTO RICO. U. S. Eng., 575 Riverside Ave., Jacksonville, Fla. CD 9/7, under LB.

CANADA

BIDS ASKED—HEAVY CONSTRUCTION

B. C., Vancouver—SCHOOL—B.A. 10/19—H. F. Hines, secy. Vancouver School Bd., 1595 W. 10 Ave., frame, concrete Gladstone Junior-Senior High School addn. $450,000. Plans deposit $35. E. D. King, 1595 W. 10 Ave., archt.

HEAVY CONSTRUCTION

LOW BIDS AND CONTRACTS

▲ **S. McNally & Sons Ltd.,** 2200 King St. E., Hamilton, Ont., LB, $1,095,000, installing, supplying 36 in. water main from Portland and Niagara Sts. to Bernard Ave. and Bedford Rd., TORONTO, ONT. City City Hall, Toronto, Ont. Bids Sept. 25. CD 8/24.

BUILDINGS

LOW BIDS AND CONTRACTS

▲ **Stone & Webster Canada Ltd.,** Bank of Nova Scotia Bldg., 44 King St. W., Toronto, Ont. CA, $9,000,000, fertilizer PLANT, KIMBERLY, B. C. Consolidated Mining & Smelting Co. of Canada Ltd., 215 St. James St. W., Montreal, Que. CD 12/21/50.

▲ **J. L. E. Price & Co. Ltd.,** 8 King St. W., Toronto, Ont., CA, $1,000,000, 1 story, 95x125 ft., steel, concrete, brick PLANT exten., NEW TORONTO, ONT. Canadian Industries Ltd., 15 St. New Toronto, Ont. Awarded 10/1.

A. W. Robertson Ltd., 57 Bloor St. W., Toronto, Ont., CA, $450,000, Kenwood-Lombard EXCHANGE addn., alterations, Dufferin St., TORONTO, ONT. Bell Telephone Co. of Canada, 76 Adelaide St. W., Toronto, Ont. Allward & Gouinlock, 57 Bloor St. W., Toronto, Ont., archts. Awarded 10/1.

▲ **G. Daneau Ltd.,** 5670 Cote des Nieges Rd., Montreal, Que., CA, $8,000,000, 500 concrete, brick, stone DUPLEXES, MONTREAL, QUE. Owner c/o C. Grenier, archt., 170 Geneva Cres., Mount Royal, Que., archt.

LATIN AMERICA

HEAVY CONSTRUCTION

LOW BIDS AND CONTRACTS

Raymond Concrete Pile Co., 140 Cedar St., New York 6, N. Y. U. S. A. CA Approx. $750,000. Port imprvs., incl. dredging, rerouting railroad tracks, a terminal and paving yards for cargo, BUENAVENTURA, COLUMBIA, S. A. Minister of P. Wks., Bogota, Columbia, S. A. CD 6/18/45.

(Proposal Advertisements see pp. 123 & 124)

OFFICIAL PROPOSALS

Bids: October 24, 1951

New York Highways Projects

NOTICE TO CONTRACTORS: STATE DEPARTMENT OF PUBLIC WORKS, ALBANY, N. Y.—Pursuant to the provisions of the Highway Law, and special provisions for projects financed with federal aid funds, sealed proposals will be received until ten-thirty o'clock A.M., eastern standard time on Wednesday, October 24, 1951 by Henry A. Cohen, Director, Bureau of Contracts & Accounts, 14th Floor, The Governor Alfred E. Smith State Office Building, Albany, N. Y., for the following projects: Maps, plans, specifications and proposal forms may be seen and obtained at the office of the State Department of Public Works, Bureau of Contracts & Accounts, Albany, N. Y., and at the office of the District Engineers noted below, and may also be seen at the District Engineers noted below, and may also be seen at the office of the State Department of Public Works, 270 Broadway, New York City.

The deposit for plans and proposal forms for each contract is indicated below. A refund will be made in full to bidders for the return of one set in good condition within 30 days of award or rejection of bids; refund for all other sets in good condition, similar period, will be 50% of deposit.

County	Contract No.	Name	Miles	Type	Deposit	Estimated Cost of Work
		DISTRICT No. 2				
		L. Ketchum, Dist. Engr., 109 No. Genesee St., Utica, N. Y.				
Hamilton	S. H. 51-10	Speculator-Indian Lake, Pt. 2A	6 19	Bit. Treated Graded Gravel	$25,000 Plans $15	$509,000
		DISTRICT No. 3				
		Wm. Robinson, Dist. Engr., Weigh Lock Bldg. Syracuse, N. Y.				
Seneca & Cayuga	O. T. 51-6	Ontario Thruway (Tyre-Montezuma)	4 15	Grading & Drainage	$110,000 Plans $15	$1,961,000
		DISTRICT No. 5				
		C. R. Waters, Dist. Engr., 65 Court St., Buffalo, N. Y.				
Erie	FAOT51-8 FAST51-7	N. Y. State Thruway-Ontario Section (Harlem Ave.-William St.) Henry Street; Parker Street; Dingens Street Proj. No. UI-1071(8)	1 82	2 Course Cem. Conc. Pavt. 2 at 37' Wide = 0.90 Mi. Bit. Mac. Ty. 1 = 0.81 Mi. Misc. Work = 0.11 Mi. Hy. Sep. Alpha I-Beam 213.7' Sp. Alpha Royalty = $260.00	$45,000 Plans $15	$780,000
		DISTRICT No. 8				
		J. S. Bixby, Dist. Engr., Plesant Valley Rd., Poughkeepsie, N. Y.				
Columbia	RC 51-77	Copake Iron Works-Bashbish Falls, S. H. 1790	1 45	Cable Guide Railing	$700 Plans $10	$13,000
		DISTRICT No. 9				
		F. W. Donovan, Dist. Engr., 71 Frederick St., Binghamton, N. Y.				
Delaware	FARC51-70	Margaretville-Halcottsville, S. H. 5384 Fleischmanns-Margaretville, S. H. 239 Proj. No. F659(4)	4 04	9" Cem. Conc. Pavt. 24'-40' Wide = 4.00 Mi. Misc. Work = 0.04 Mi.	$70,000 Plans $25	$1,212,000
		DISTRICT No. 10				
		J. J. Darcy, Dist. Engr., Montauk Hwy. at Little E. Neck Rd., Babylon, L. I., N. Y.				
Nassau	N. E. 51-1	Nassau Expressway-Seagirt Boulevard Interchange Contract 1	0 01	Pile Foundation	$7,000 Plans $10	$130,000
Nassau	FAS SH51-8 FARC 51-69	Wantagh-Central Park, Pt. 2 & Pt. 3 Proj. S212(2)	2 06	9" Unreinf. Cem. Conc. Pavt. 2 at 25' Wide = 1.75 Mi. Misc. Work = 0.31 Mi.	$50,000 Plans $15	$903,000

Special attention of bidders is called to "General Information for Bidders" in the proposal, specification, and contract agreement, and to the special provisions applying to projects financed with federal funds. Award of a contract is subject to the "Controlled Materials Plan" of the National Production Authority as well as to regulations issued thereunder.

Proposal for each contract must be submitted in a separate sealed envelope with the name and number of the contract plainly endorsed on the outside of the envelope. Each proposal must be accompanied by draft or certified check payable to the order of the "State of New York, Commissioner of Taxation and Finance" for the sum as specified in the advertisement and the proposal. The retention and disposal of the bidding check, the execution of the contract and bonds shall conform to the provisions of the Highway Law, as set forth in "Instructions to Bidders."

When optional types are permitted on contracts with federal funds, bidders must state in the space provided in the proposal the exact designation of the optional type upon which the proposal is predicated.

The right is reserved to reject any or all bids.

B. D. TALLAMY
Supt. of Public Works

Bids: October 16, 1951

THE HYDRO-ELECTRIC POWER COMMISSION OF ONTARIO

SIR ADAM BECK-NIAGARA GENERATING STATION NO. 2
TENDERS FOR CONSTRUCTION OF HYDRAULIC TUNNEL

Sealed tenders, in duplicate, addressed to the undersigned and clearly marked "Tender for Hydraulic Tunnel, Section No. 5 . . . . . , Sir Adam Beck-Niagara Generating Station No. 2" will be received up to 4 p.m., Eastern Standard Time.

Tuesday, October 16th, 1951

for the construction of the Section of Hydraulic Tunnel, approximately 3,680 feet in length, or circular cross-section, concrete-lined, with 45 feet finished diameter. The principal features of the work to be performed in the Section comprise:—one offset work shaft, with cross-cut drift to the tunnel, excavation of tunnel, installation of structural steel support, construction of concrete lining reinforced where required, grouting of rock and behind concrete lining wherever necessary, and dewatering of the work.

Copies of Form of Agreement, Information for and Instructions to Tenderers, General Conditions and Specification, Plans, Form of Tender and Labour Agreement may be obtained on or after September 19th, 1951 from the Director of Supply, 620 University Avenue, Toronto, Ontario, upon payment of a deposit in the amount of $1,000.00 per set, which amount will be refunded upon submission of a tender accompanied by the required security. If no such tender is submitted but the documents are returned in good order $750.00 of the said deposit will be returned. Failing return of the documents in good order the Commission will retain the full amount of the deposit.

Each tender for Section No. 5 of the Hydraulic Tunnel must be accompanied by a certified cheque on a Canadian Chartered Bank for the sum of Three Hundred Thousand Dollars ($300,000.00) payable to the order of the Commission. The Tenderer to whom a contract is awarded shall be required to provide a performance bond satisfactory to the Commission for fifty per cent (50%) of its tender price. Each certified cheque, furnished by each Tenderer, will be retained by the Commission until the contract for the Section has been executed and the required performance bond has been furnished. As soon as possible thereafter, the certified cheques of the unsuccessful tenderers will be returned. If a Tenderer after being awarded a contract for the Section, refuses to execute the contract or fails to furnish the required performance bond, One Hundred and Fifty Thousand Dollars ($150,000.00) of the proceeds of the certified cheque of such Tenderer shall be forfeited to the Commission as ascertained and liquidated damages and the balance returned. If the successful tenderer fulfills the obligations as to executing a contract and furnishing a performance bond, its certified cheque will be returned.

The lowest or any tender will not necessarily be accepted.

Robert H. Saunders, C.B.E., K.C., Chairman, and Members of The Hydro-Electric Power Commission of Ontario,
620 University Avenue,
TORONTO 2, Ontario

Bids: October 22, 1951

Transit Sheds & Shipping Facilities

PUERTO RICO TRANSPORTATION AUTHORITY

The Puerto Rico Transportation Authority will receive sealed bids for the construction of Transit Sheds and Shipping Facilities, until 2:00 P.M. (Puerto Rico Time) on the 22nd day of October, 1951, at the office of its General Manager at Building 53, Isla Grande Airport, San Juan, Puerto Rico, at which time and place all bids will be publicly opened and read aloud.

The construction will consist principally of transit sheds, miscellaneous buildings, filling, grading, concrete and bituminous paving, railroad tracks, electric lighting, piping, storm drains and other facilities.

The successful bidder will be required to furnish satisfactory performance and payment bond or bonds.

Proposed forms of contract documents, including plans and specifications, are on file at the office of the Chief Engineer of the Puerto Rico Transportation Authority, at Building 53, Isla Grande Airport, San Juan, Puerto Rico.

Copies of the documents may be obtained until 60 hours prior to assigned time for opening bids by depositing $100.00 with the Puerto Rico Transportation Authority for each set of documents so obtained. The amount of the deposit will be refunded to each person who returns the plans and documents in good conditions within 10 days after the opening of bids.

However ninety dollars ($90.00) only will be refunded to bona-fide bidders for extra sets returned and those taking sets and not filing formal proposals.

A set of drawings and specifications will be available for inspection only at the Office of Frederick Snare Corporation, Contracting Engineers, 233 Broadway, New York 7, New York.

The Puerto Rico Transportation Authority reserves the right to reject any or all bids and waive any informalities in bidding.

A certified check or bank draft payable to the Puerto Rico Transportation Authority, U. S. Government Bonds, or a satisfactory bid bond executed by the bidder and acceptable sureties in an amount equal to (5%) five per cent of the bid shall be submitted with each bid.

San Juan, Puerto Rico
September 14, 1951

SALVADOR V. CARO
General Manager

Bids: October 29, 1951

George Washington Bridge West 179th Street Tunnel

THE PORT OF NEW YORK AUTHORITY
TUNNEL PAVING

CONTRACT GWB-120.018

Sealed proposal for paving of the West 179th Street Tunnel, New York City, will be received in the office of the Chief Engineer of The Port of New York Authority, Room 1100, 111 8th Ave., New York 11, until 11:30 A.M., Monday, October 29, 1951, at which time and place said proposals will be opened and read.

Contract documents may be seen at the office of the Chief Engineer and copies will be furnished upon deposit of $10 per set. The deposit will be remitted if the documents are returned in good condition, not later than 30 days after the opening of proposals.

THE PORT OF NEW YORK AUTHORITY
Howard S. Cullman, Chairman
New York, October 11, 1951

U. S. Government

UNITED STATES DEPARTMENT OF THE INTERIOR, Bureau of Reclamation, Sealed bids (Specifications No. DC-3557) will be received by Bureau of Reclamation, Ephrata, Washington until October 25, 1951, and then publicly opened for furnishing labor and materials and performing all work for the alterations of pump discharge pipes, Grand Coulee Pumping Plant. The work is situated near Grand Coulee Pumping Plant, 30 miles north and east of Odair, Washington. Principal items are: Repair of pump discharge pipe No. 1, and alterations of pump discharge pipes No. 4 to 6, inclusive. Time allowed for completion will be 270 days. For particulars, address Bureau of Reclamation, Ephrata, Washington; or Building 53, Denver Federal Center, Denver, Colorado.

UNITED STATES DEPARTMENT OF THE INTERIOR, Bureau of Reclamation, Sealed bids (Specifications No. DC-3560) will be received by Bureau of Reclamation, Davis Dam, Arizona, until October 30, 1951, and then publicly opened for furnishing labor and materials and performing all work for the installation of metalwork, heating and ventilating systems and piping for Davis Dam and Power Plant. The work is situated on the Colorado River and approximately 30 miles west of Kingman, Arizona. Principal items are approximately: Installing metal doors and windows, lump sum; installing steel pipe handrails and ladders, lump sum; furnishing and installing heating and ventilating systems, lump sum; installing draft-tube water level automatic depressor systems, lump sum; and other work. Time allowed for completion will be 180 days. For particulars, address Bureau of Reclamation, Davis Dam, Arizona; or Building 53, Denver Federal Center, Denver, Colorado.

UNITED STATES DEPARTMENT OF THE INTERIOR, Bureau of Reclamation, Sealed bids (Specifications No. DC-3547) will be received by Bureau of Reclamation, Loveland, Colorado, until October 30, 1951, and then publicly opened for furnishing labor and materials and performing all work for the construction of Carter Lake pressure conduit, Estes Park-Foothills Power Aqueduct, Colorado-Big Thompson Project, Colorado. The work is situated 9 miles west of Loveland, Colorado. Principal items are approximately: excavation 40,000 cu yds.; furnishing and laying 1,330 lin. ft. of 96 inch precast pressure conduit or furnishing materials for and constructing 1,330 lin. ft. of monolithic pressure conduit; and other work. Time allowed for completion will be 100 days. For particulars, address Bureau of Reclamation, Loveland, Colorado; or Building 53, Denver Federal Center, Denver, Colorado.

UNITED STATES DEPARTMENT OF THE INTERIOR, Bureau of Reclamation, Sealed bids (Specifications No. DC-3555) will be received by Bureau of Reclamation, Cody, Wyoming, until October 25, 1951, and then publicly opened for furnishing labor and materials and performing all work for the construction of the Lovell-Yellowtail 115-kilovolt transmission line, Missouri River Basin Project, Wyoming-Montana. The work is situated between Lovell, Wyoming, and Yellowtail, approximately 30 miles south of Hardin, Montana. The transmission line will be 3-phase, single-circuit, wood-pole, H-frame type, approximately 46 miles long, with 2 overhead ground wires for the entire length. Contractor is to furnish all materials. Time allowed for completion will be 450 days. For particulars, address Bureau of Reclamation, Cody, Wyoming; or Building 53, Denver Federal Center, Denver, Colorado.

Department of Commerce, Bureau of Public Roads, September 25, 1951. SEALED BIDS will be received at the office of the Division Engineer, Bureau of Public Roads, 1440 Columbia Pike, Arlington, Virginia, until 11:00 a.m., E. S. T., October 26, 1951, for Project 1A2, Baltimore-Washington Parkway, Prince Georges County, Maryland. Bridge under Defense Highway and approaches. Length 0.482 mile. The approximate quantities of the more important items are as follows: 239,400 cu. yd. Excavation, 2,520 cu. yd. Cement Concrete, 322,000 lb. Reinforcing Steel, 315 cu yd. Stone Masonry, 10,000 lin. ft. Treated Timber Piling and 2,300 tons Type I-1 Hot Asphalt Concrete Pavement. Minimum wage rates have been fixed as required by law. Plans, specifications and proposal forms are available upon request at the address given above. H. J. Spelman, Division Engineer.

OFFICIAL PROPOSALS

Bids: October 23, 1951

Clearing and Grubbing Neversink Reservoir

CONTRACT 387

SEALED BIDS will be received by the Board of Water Supply, at its offices, thirteenth floor, 120 Wall Street, New York City, until 11:00 A.M., Eastern Standard Time, on Tuesday, October 23, 1951, for Contract 387, for clearing and grubbing the Neversink reservoir in preparation for the storage of water. The work will comprise the clearing of approximately 1,150 acres, the grubbing of about 475 acres, and required excavation, seeding and removal of excrementitious material, all as set forth in the specifications. The Neversink reservoir is located in the Town of Neversink, Sullivan county, New York.

No bid will be received and deposited unless accompanied by a certified check upon a National or State bank, drawn and made payable to the order of the Comptroller of the City of New York, in the amount of thirty-five thousand dollars ($35,000.00), for the proper execution of the contract.

At the above place and time the bids will be publicly opened and read. Pamphlets containing information for bidders, forms of bid and contract, specifications, contract drawings, requirements as to surety, etc., can be obtained at the office of the Chief Engineer, Room 1311, at the above address, upon application in person or by mail, by depositing the sum of five dollars ($5.00) in cash or its equivalent for each pamphlet. Within 30 days following the award of contract or rejection of bids, the full amount of such deposit will be refunded for each pamphlet submitted as a bid and a refund of four dollars ($4.00) will be made for each other pamphlet returned in acceptable condition. Arrangements will be made whereby prospective bidders desiring blueprints of the contract drawings for their own use may secure same, the cost thereof to be paid by them. For further particulars, apply at the office of the Chief Engineer at the above address.

IRVING T. A. HUIE, President, RUFUS E. McGAHEN, EDWARD C. MAGUIRE, Commissioners, Board of Water Supply; RICHARD H. BURKE, Secretary.

U. S. Government

UNITED STATES DEPARTMENT OF THE INTERIOR, Bureau of Reclamation, Sealed bids (Specifications No. DC-3561) will be received by Bureau of Reclamation, Phoenix, Arizona until November 1, 1951, and then publicly opened for furnishing labor and materials and performing all work for repairing turbine runners, Units Nos. 1 to 4 inclusive, in Parker Power Plant, Arizona-California. The work is situated at Parker Dam, California. Principal items are approximately: (1) repairing 650 linear inches of cracks by single U-groove welds; (2) repairing 730 linear inches of cracks by double U-groove welds; (3) furnishing 700 lbs. of insert plates; (4) installing 400 linear inches of insert plates by double U-groove welds; (5) applying 3,680 sq. in. of stainless steel surfacing by welding; and (6) modifying fillets at outflow edge of 60 runner vanes. Time allowed for completion will be 120 days. For particulars, address Bureau of Reclamation, Phoenix, Arizona; or Building 53, Denver Federal Center, Denver, Colorado.

Contractors Watch

This Section —

for new projects. Publish your announcements through the proposal sections of *Engineering News-Record* and get their bids.

SEARCHLIGHT SECTION

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REPLIES (Box No.): Address to office nearest you
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CHICAGO: 520 N. Michigan Ave. (11)
SAN FRANCISCO: 68 Post St. (4)

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ASST. CITY Engineer Building Inspector, $3900 to $4230 per annum, vacation, sick leave. Opportunity for young man. Write City Manager, Iowa City, Iowa.

BRIDGE AND Highway Engineers: Designers, Draftsmen and Traffic engineers needed. Interesting projects, permanent positions, good pay, no regimentation. Give full details first letter. Frank D. McEnteer, Consulting Engineer, 504 Baltimore Ave., Clarksburg, W. Va.

CHEMIST OR Chemical Engineer for research laboratory. We need graduate chemist or Chemical engineer with at least 5 years practical experience with bituminous paving materials. We will be particularly interested in a man with State Highway testing laboratory experience. Position open offers opportunity to grow with an expanding International Organization. Salary open. Location of work in large Eastern City, excellent working conditions. Send complete resume including age, schooling, experience, salary desired, etc. Write P-2044, Engineering News-Record.

CONSTRUCTION SUPERINTENDENT. Permanent position. Must be top grade building construction management man with extensive industrial and monumental project experience. Nationally prominent construction company established over 50 years offers good opportunity to right man. Our Personnel knows of this ad. A complete experience record is desired. Address Box P-2079, Engineering News-Record.

CONTRACTOR'S ENGINEER. Wanted. Experienced in quantity surveying on all types of General Building Construction for General Contractor's Office located in Central Pennsylvania. Civil Engineering graduate preferred but not essential. Advise education, experience and salary expected. P-2092, Engineering News-Record.

DETAILER AND Checker—Experienced in making and checking shop details for steel fabrication plant. All types of steel construction. State experience, references, and rate expected. Savannah Machine and Foundry Company, P. O. Box 590, Savannah, Georgia.

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ENGINEERS WITH Experience in preparation of plans for sewage and water treatment projects or related experience. Location Northwestern Ohio. P-2070, Engineering News-Record.

EXPERIENCED CONSTRUCTION Engineer for Bergen County Building Contractor of Schools. Reply Box P-2138, Engineering News-Record.

FIELD ENGINEER. Permanent position. Desired for nationally prominent construction company. Man desired must have had heavy experience on layout work for foundations and building interiors. When replying, forward complete experience record. Address Box P-2080, Engineering News-Record.

(Continued on page 127)

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P-2048, Engineering News-Record
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P-2041, Engineering News-Record
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P-2136, Engineering News-Record
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P-2153, Engineering News-Record
330 W. 42 St., New York 18, N. Y.

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P-2046, Engineering News-Record
520 N. Michigan Ave., Chicago 11, Ill.

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POSITIONS VACANT

(Continued from page 125)

HEATING AND Refrigeration Engineer wanted. Must be capable of handling mechanical layout, design, and supervision of such installation. Locations of offices served are Racine, Wisconsin; Waukegan, Illinois; Lake Forest, Illinois; and Evanston, Illinois. Pay commensurate with ability. The firm is one of the largest plumbing, heating and refrigeration companies between Chicago and Milwaukee, and is expanding its services yearly. Stiles & Horne, Inc., 648 North Western Ave., Lake Forest, Illinois.

STRUCTURAL ENGINEER: Experienced in steel design industrial and commercial buildings by a leading Middle-West structural steel fabricating company. Excellent opportunity for qualified man. Permanent. P-1939, Engineering News-Record.

TOPOGRAPHER—MUST be U. S. Citizen. Experienced in large scale plane table mapping. Location Metropolitan Long Island. P-2131, Engineering News-Record.

WANTED—CIVIL Engineer graduate, some reinforced concrete structural design experience preferred, by long established engineering promotional and educational organization to be representative in the Metropolitan New York Area. Age 25 to 40. Give resume of education, engineering experience, and salary requirements in reply. P-2137, Engineering News-Record.

WANTED IMMEDIATELY: Superintendent or assistant superintendent thoroughly experienced to supervise large draglines, dozers, drilling equipment and dynamiting on large canal and levee project. Must have the push for guaranteed yardage output monthly. Permanent position if qualified. Write to Box Number P-2061, Engineering News-Record.

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POSITIONS WANTED

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Of Engineering News-Record published Weekly at Albany, New York, for October 1, 1951.

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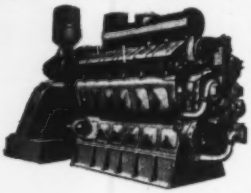

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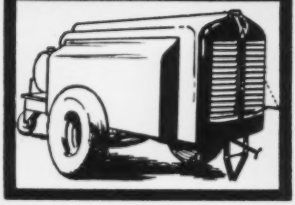

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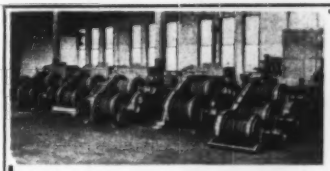

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2 D-8 Caterpillar Tractors with Caterpillar B/D Blades and D.D.P.C.U's.
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NEW PRODUCTS

Electrically-operated vibratory compactor

Said to be ideal for compaction of asphalt, granular soils and water-bound macadam bases, this compactor propels itself along (unless held back) at about 25 ft per minute, delivering 4500 1½-ton blows meanwhile. Its smooth base is used advantageously for hot or cold asphalt pavement patching and is quickly interchangeable with a corrugated base which can handle most granular materials in 12-in. lifts, generally attaining maximum density in two passes. There's only one moving part—the shaft of the heavy-duty vibratory motor. Auto trailer unit in the background carries a 2.5-kva (2,500-watt) power plant as well as an hydraulic jack for lifting and lowering the compactor. Its plant generates both single-phase and 3-phase 110-volt, 60-cycle alternating current and may be used to operate other tools and lights that may be required on the construction job, according to the manufacturer, JACKSON VIBRATORS INC., LUDINGTON, MICHIGAN.

Car puller

There's no need to have an engine and crew on the job to shuttle and relocate freight cars during unloading and loading operations. You don't even need a high-priced operator on an expensive tractor or rubber-tired pusher of some kind. Instead set up a drum-type car puller with two lines as pictured above. One line is hooked directly to the side of the car; the other passes through an anchor block at the far end of the run and back to the same car fitting. In this in-

(Continued on page 138)

IN THIS NEW SKATING RINK . . .

Byers Wrought Iron Pipe helps keep maintenance costs

from cutting a fancy figure

Recognizing that pipe failure in the skating rink of the new Onondaga County Memorial Auditorium, Syracuse, N.Y., would result in costly "down-time" plus possible replacements or excessive repairs, the designers took decisive steps to assure permanence by specifying genuine wrought iron pipe. Byers 1" Wrought Iron pipe on 4" centers was installed. This corrosive resistant material was also used to safeguard the pipe coils in the ice dumps, waste pipe vent stacks, and roof drainage and fire stand piping. Edgarton and Edgarton, Architect—Engineer Associates were the architect; Robson and Woese, the mechanical engineers.

Because of the severe conditions in skating rink installations, any pipe that is not inherently corrosion-resistant is doomed to early failure. And since corrosion is a factor which cannot be eliminated, the only practical solution is in the use of a durable pipe material. The superior service qualities of genuine wrought iron for this service have been decisively confirmed in dozens of installations. Its widespread and continued use is the best possible index of its ability to stay on the job longer, at low cost per year.

You'll find some interesting information in your bulletin, WROUGHT IRON IN REFRIGERATION AND AIR CONDITIONING SYSTEMS. Write for a copy.

A. M. Byers Company, Pittsburgh, Pa. Established 1864. Boston, New York, Philadelphia, Washington, Atlanta, Chicago, St. Louis, Houston, San Francisco. Export Division: New York, N. Y.

WHY GENUINE WROUGHT IRON LASTS

This notch-fracture test specimen illustrates the unique fibrous structure of genuine wrought iron—which is responsible for the high corrosion resistance of the material. Tiny threads of glass-like silicate slag, distributed through the body of high-purity iron, halt and disperse corrosive attack, and discourage pitting and penetration. They also anchor the initial protective scale, which shields the underlying metal.

BYERS

CORROSION COSTS YOU MORE THAN WROUGHT IRON

WROUGHT IRON

TUBULAR AND HOT ROLLED PRODUCTS

ELECTRIC FURNACE QUALITY ALLOY AND STAINLESS STEEL PRODUCTS

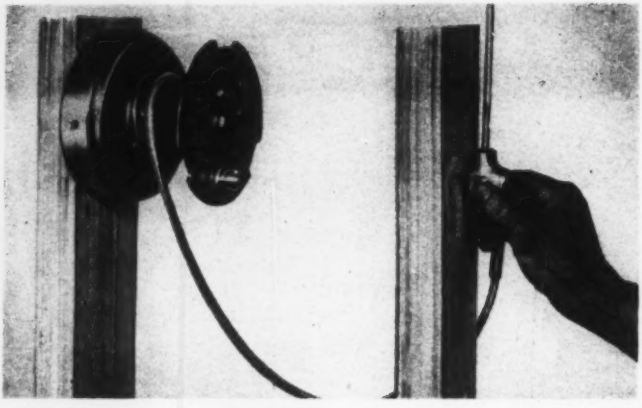
New products . . .

stance two different sizes of aggregates were loaded into opposite ends of gondola cars, although delivery came alternately through one common outlet chute. Models vary in size and power for different jobs. American Hoist & Derrick Company, Saint Paul 1, Minnesota

Portable crushing and screening plant

Built around a Dodd triple jaw crusher with a jaw opening of 11 x 24 in., this new portable crushing-screening plant has been designed for rock and/or gravel operations. Material is fed from a scoop which can be loaded at ground height. The sizing screen is a double-decker. It can be set to remove both fines and oversize or can be adjusted so that all the material is delivered to the leading conveyor.

This Dodd plant is 25 ft long, 92 in. wide, 8 ft high, and weighs 16,000 lb. Rated capacity is 30 tons/hr of 1½-in. stone. Safety springs compress if tramp iron gets into the crusher, thus eliminating costly downtime. Union Boiler & Manufacturing Company, Lebanon, Pennsylvania.



Water level transfers grade marks

Working on the elementary principle that water seeks its own level, this Hydrolevel can stand or hang somewhere in the center of a job or area and will transfer relative grade marks wherever needed within the radius of its 40-ft tube.

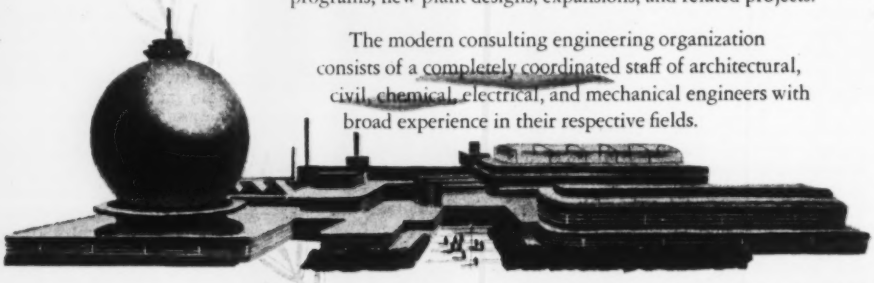
Device was made for carpenters, masons, plumbers, shorers, movers and the like. it can be operated by one man. Reservoir, tube and level sight are of transparent material to show levels and any air bubbles which must be removed before measurements begin. No delicate parts, no sensitive adjustments; hence no special precautions for transportation etc. Hydrolevel, 95 De Soto Avenue, Ocean Springs, Mississippi.

(*Continued on page 140*)

. . . . The Trend in Progressive Thinking

Top management is coming more and more to seek the services of independent consulting engineering organizations to supply specialized talent in working out modernization programs, new plant designs, expansions, and related projects.

The modern consulting engineering organization consists of a completely coordinated staff of architectural, civil, chemical, electrical, and mechanical engineers with broad experience in their respective fields.



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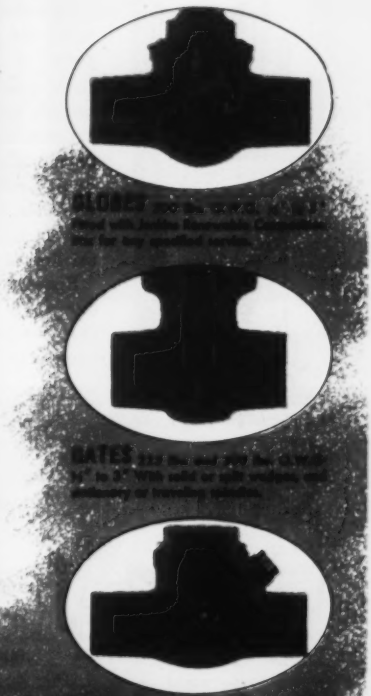
To give you Solder End Valves that meet *every* test in the toughest service Jenkins valve specialists designed them with an extra measure of rugged endurance, along with the dimensional accuracy and operating efficiency you expect in all valves of Jenkins quality.

A new Folder, Form 198, describes the complete line of Jenkins Solder End Valves, shows construction details, and gives instructions for correct installation. Get your copy—see why so many economy-wise valve buyers specify *Jenkins*. Jenkins Bros., 100 Park Ave., New York 17. Jenkins Bros., Ltd., Montreal.



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Heltzel-engineered equipment provides that element of efficiency so important when man hours count highly. Each product in the Heltzel line is backed by 40 years experience in the concrete industry. Contractors and concrete producers know that Heltzel builds quality, high performance equipment. It stands the test of time and rugged operating conditions. Some of the Heltzel line of products are pictured here.

Specific information on any Heltzel equipment may be had by writing to our Warren office or contacting your nearest Heltzel distributor.

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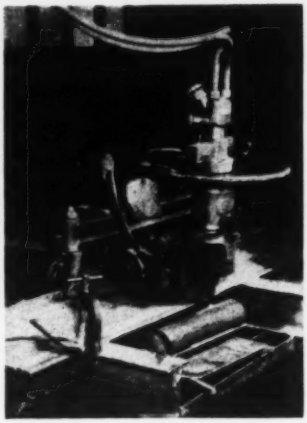

Shields available for studs and anchor bolts

Any contractor who has installed studs or anchor bolts only to find later that their threads have been mutilated or scored will be pleased to hear that heavy steel stud shields are available for protecting them. Four cuts are made in steel pipe while it is clamped in a jig (above). The cut sections are then heated and shaped, welded, and the shield interior partially threaded. With their installation the fear of damaged and stripped threads disappear.

Transparent masonry moisture seal

A new colorless masonry seal is now available for above-grade exterior application. Containing a special silicone base, Silaseal has been designed specifically for stone, brick, cement block and masonry joint protection. The water repellent is said to contain no wax or oils, thus providing a completely invisible coating of masonry pores, penetrating to depths up to ⅛ in. below the surface. Applicable by brush or spray in summer or winter, it is said not to allow soot or dirt to adhere. The Surface Protection Company, 16801-C, Cleveland, Ohio.

Rubber "Trafficones" channel vehicles

Though they're made of heavy rubber, these cone-shaped traffic barriers and channelers have the appearance of

(Continued on page 142)

A New Heavy-weight

tough enough to lick your meanest digging jobs

4-yard Heavy Duty Cast Weld dipper on P&H 1400.

With a surplus of fight where it counts most, *ESCO* Heavy Duty Cast Weld dippers stand up on equipment-killing jobs where only the best is tough enough. Here's the inside story of this rugged new Heavyweight:

- **Back connections to fit any make of machine.**
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- **Shell and back beams fabricated of heavy plate steel.**
- **Manganese or alloy steel bushings on pin connections.**
- **Size ⅜ to 6 yards.**

Maintenance, when at last it becomes necessary, is quickly done on the job with ordinary methods and electrodes.

For details of weights and dimensions, see your *ESCO* dealer, or send us the filled-in coupon for bulletin 189, "*ESCO* Dipper Buckets".

Manganese steel doors and hinges stand up under shock and heavy loads. Free working latch mechanism.

Wide set teeth and tapered box promote fast digging and quick, complete discharge.

Massive rock-type front casting of manganese steel resists shock and wear of digging. Tooth holders cast integrally with cutting lip.

Hollow beam construction increases strength, reduces weight. Heavy duty back connections and ribs.

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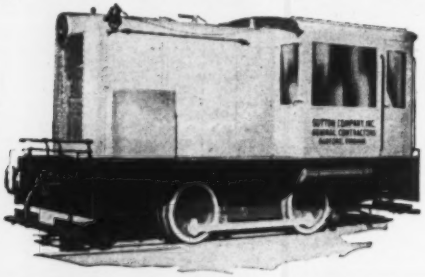

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STONE R. R. VIADUCT REPAIRED WITH "GUNITE"

The above photographs show a large stone viaduct belonging to an eastern Railroad. This structure, built in 1888, was originally designed for a single track, but was later changed to accommodate double tracks. Increase locomotive weights and power caused the mortar in the joints to chink out due to vibration. Cement Gun crews made the viaduct "as good as new" by repointing the joints, and grouting one of the arches over the Highway.

This job of repointing the masonry joints and the grouting was accomplished by using the "CEMENT GUN" nozzle for filling the joints.

Many other instances of repair, remodeling and new construction with "GUNITE" are described and pictured in Bulletin A2400. A request, on your letterhead, will bring a free copy by return mail.

CEMENT GUN COMPANY
"GUNITE" CONTRACTORS
GENERAL OFFICES—ALLENTOWN, PENNA. U.S.A.
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New products . . .

steel and command a lot of respect from motorists and truckers alike. Contractors, utilities, school and police departments are pleased with their minimum storage space, ease of handling, and no breaking or distortion. A main Trafficone barricade stands 40 in. high with its sign and weighs 6½ lb. Cones themselves are 18 in. high, weigh only 2½ lb. INTERSTATE RUBBER PRODUCTS CORP., 908 AVILA STREET, LOS ANGELES, CALIFORNIA.

Rolling toggle for jaw crusher

When a large timber or piece of scrap metal is accidentally fed into a jaw crusher, you would expect more damage than just the shearing of a few rivets. But that's all that happens according to one manufacturer, because of a new dry rolling toggle. Since the ends roll—not slide—on the mating toggle seats, minimum wear is induced. The toggle incorporates a safety shear member between the pitman and the frame so that the shearing occurs instead of a complete breakdown. These rivets are easily replaced in the field and the machine is easily put back into operation. To assure the rolling action between mating toggle ends, a high coefficient of friction is needed and is obtained by using no lubrication. This in turn helps keep the area under the crusher dry and clean, while lowering lubrication costs. The crusher in question is the "A-1" made by ALLIS-CHALMERS MANUFACTURING COMPANY, MILWAUKEE, WISCONSIN.

Remote readings

Remote tension, weight and traction readings are accomplished with this new Tens-O-Trol System. Here's a simple explanation of how the equipment functions: To a standard traction dynamometer the manufacturer has mounted a ball-bearing type selsyn motor. (Selsyn is a contraction for self-synchronizing). This is connected by a rubber-covered cable to a repeater motor housed in a metal cabinet. An external 12-volt battery supplies the necessary current. When a switch is thrown on the front of the cabinet the system becomes operative and loads imposed on the dynamometer transmitter are instantly read at the repeater station at distances up to 400 feet away. For further information and specifications write to W. C. DILLON AND COMPANY INC., 1421 S. CIRCLE AVENUE, FOREST PARK, ILLINOIS.

MANUFACTURERS' PUBLICATIONS

Feeders and conveyors — Capacities from a few ounces to 2,000 tons per hour—sizes from one micron to four-foot cubes—densities from 4 lb to 400 lb per cubic foot—these are some of the capacities and characteristics of these Jeffrey-Traylor electric vibrating feeders and conveyors. Most important feature, however, is the company's claim to instantaneous and absolute control over the flow of material. Their 84-page booklet is crammed with information on power unit, controls, and specifications on each of their dozens of types. Typical application of grizzly feeders, spreader feeders, dust-tight, sparkproof and waterproof feeders fill the booklet and the rear section contains valuable information in the form of tables to determine valley angles, etc. All in all, it's about the most complete booklet of its kind we've seen. THE JEFFREY MANUFACTURING COMPANY, COLUMBUS 16, OHIO.

Insulated doors—This is a 12-page data and specification booklet to guide architects, contractors and builders in selection of proper types of cold storage doors for various temperature conditions. Basic types are shown: reach-in, walk-in, track and vestibule models. An additional helpful feature is a check list of items to remember when selecting and/or specifying such a cold-storage door. JAMISON COLD STORAGE DOOR COMPANY, HAGERSTOWN, MARYLAND.

Power buggies and screening machines —are the subjects of two 4-page folders from Whiteman. The first concerns the new FR-51 Power Buggy with a 44 x 60-in. flat bed and 2000-lb capacity. Several on-the-job photos are included. The other shows pictures and reproductions of letters from satisfied contractors who have been pleased with the 44-8 and RS-5 portable screeding machines. WHITEMAN MANUFACTURING COMPANY, 3249 CASITAS AVENUE, LOS ANGELES 39, CALIFORNIA.

Ventilators and louvers—A new condensed catalog supplies design and construction features for each ventilator type plus mounting and flashing details; performance, dimension and weight data. Basic information on dampers, bases, industrial louvers and general purpose louvers is also included. THE BURT MANUFACTURING COMPANY, DEPT. EN, 927 SOUTH HIGH STREET, AKRON 11, OHIO.

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ENGINEERING NEWS-RECORD

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What's it like in the Army?

The dust, grime and sweat, and the clank and roar of heavy machines at work—these sights and sounds are the same.

The sweat-soaked fatigues, jangling dog-tags and the precise way each man goes about his assigned job are all truly—and sadly—reminiscent of other engineer troops in training.

But there's a difference. At least, here at Camp Atterbury, Indiana, there is.

It's not the old business of building, say, a timber bridge; being given the traditional 10-minute break; then hearing shouted that order so familiar to World War II trainees: "Okay, men, you're on your own time. Tear it down!"

Here at Atterbury, the 484th Engineer Construction Battalion is in training, sure enough. But it is training by building permanence and usefulness into the post's deteriorated facilities.

• **Plenty of work**—And there's plenty of useful work to be done.

Reactivated less than two years ago, Camp Atterbury sprawls over some 70 square miles of rolling Indiana farmland south of Indianapolis. Five years of inactivity had played hob with camp facilities: Roads, buildings, utilities went slowly but inexorably to pot.

And, although most of the rehabilitation work falls properly enough to the Post Engineer—there's plenty of heavy construction work left for an outfit like the 484th.

A partial list of what they've done includes:

Resurfacing, regrading, rebuilding more than 20 miles of roads; construction of dozens of bridges and culverts of all descriptions; laying several miles of railroad track and maintaining miles more; design of a 10,000-ft storm sewer system—as well as such odd jobs as building loading platforms, rehabilitating PX buildings, building timber foot-bridges, dismantling and re-erecting buildings.

• **Long trail**—Watching men of the 484th go about their jobs as would any long-trained, well organized construction gang, it's almost impossible to believe that few of them had ever seen such work a year ago.

The battalion's present commander, Maj. Lawrence Curran, talks slowly, but moves his lanky frame fast to watch his scattered men, as he gives you the picture:

The 484th's home is York, Pa., where its members met twice a month, getting what training they could by stealing hours from their leisure time. Half its 125 enlisted and officer personnel were engineers or construction men by vocation. The rest were everything from clothing salesmen to railroad conductors in civilian life—engineer troops because of previous Army training, or a bent for the work.

On Sept. 4, 1950, the 125 were called to active duty and sent to Ft. Leonard Wood, Mo. To them there—"fresh from the hills," as Major Curran puts it—came nearly 600 raw recruits from the Kentucky and Tennessee hill country. Many of them had never gotten beyond the fifth grade in school—most had never seen a machine bigger than a motor car.

The 484th's original cadre buckled down—abandoned most of its construction work for a time, and gave the recruits basic training: the manual of arms, target practice, military courtesy and the rest. "Didn't hurt us much either," twinkles Major Curran, reminiscing.

• **And to school**—Four months of basic, and the soft-talking men of the battalion were ready for other training. And training they got—at dozens of Army schools for specialists. And by the same alchemy demonstrated by Americans in other emergencies, the hillmen came back to the 484th as expert operators and mechanics, good carpenters, good concrete men, welders, rodmen, steel erectors.

• **And to work**—And in March, 1951, with a close-knit, smoothly working team, the 484th moved to Atterbury—first as a temporary assignment, then permanently.

Under Lt. Col. Walter R. Arnold (now transferred to the Far East) the unit set itself up with something over $1,000,000 worth of equipment and went to work.

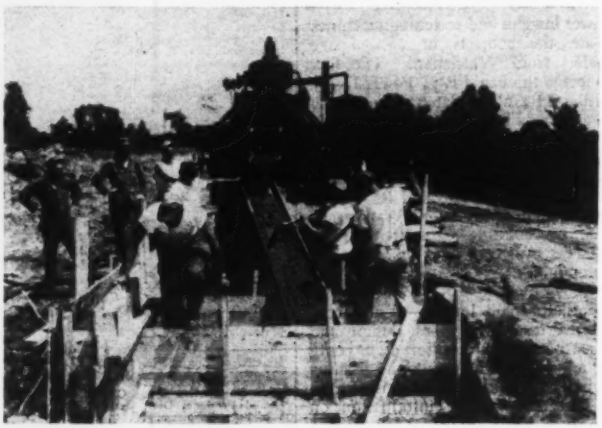
One of the jobs it did—and is still doing—was to rehabilitate public roads used by military vehicles—work that involves paving, building new culverts and bridges, restoring grades.

• **So this is how it is**—Today, the 484th is serving another purpose too—it has become a training ground for engineer replacements. As "rotation" demands new men overseas, the battalion is drawn upon for experts. As replacements, it gets raw recruits.

"We can't afford to set up training programs for a few men at a time," comments Curran. "So we do the next best thing: we put 'em to work with the others. And they learn."

So this is how it is: The work is hard and long (10-hr shifts, sometimes); you work in the grime and mud and hot sun; you work for little pay; you see your best men go; and "the Army is still the Army."

But you have a terrific pride in your officers and buddies and what they can do—and you can see solid, useful, permanent work that you and they have done together.



ENGINEER TROOPS at Camp Atterbury, Ind., get real construction experience by extending culverts on a county road which must be widened to give the camp better service.

ARE YOU GETTING SAVINGS LIKE THESE?

Here's a contractor who *is* . . with a MICHIGAN Truck Excavator-Crane.

On the Elk River Bridge Project, Garrett & Farris Company of Knoxville, Tennessee, uses it's MICHIGAN to pour concrete . . . strip forms . . . charge the batcher . . . excavate for pier foundations . . . load materials at a rail siding four miles distant and unload back at the job . . . sort pilings and supply the pile driver . . . position the pile puller when needed . . . all in a day's routine.

And look at some of the savings:

ONLY 3 MEN NEEDED ON BATCHING AND POURING.

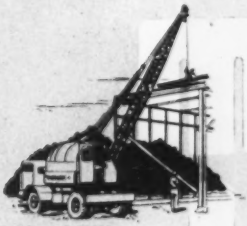
A HALF-HOUR JOB THAT FORMERLY TOOK HALF A DAY . . . here the MICHIGAN reduces labor costs 80%.

75% MAN-POWER SAVINGS BY HANDLING STRIPPED FORMS with the MICHIGAN.

When it's versatility and savings you want . . . investigate MICHIGAN . . . you'll agree it's your best buy!

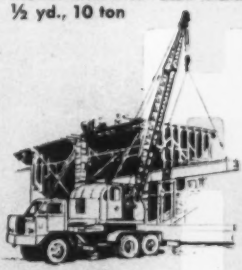
MICHIGAN POWER SHOVEL COMPANY

500 Second Street, Benton Harbor, Michigan, U. S. A.



Model T6K
¾ yd., 6 ton

Model TMDT-16
½ yd., 10 ton



Model TLDT-20
12 ton

Series 8
½ yd., 8 ton

Model C-16
½ yd., 8 ton

KEEPS SCRAPING AND SCRIMPING
on TIMKEN® bearings

THIS new LaPlant Choate model TS 200 "Motor Scraper" can travel up to 25.30 miles per hour, has a scraper capacity of 13 cubic yards. To keep the scraper operating smoothly in the roughest going, a total of 16 Timken® bearings are used on the final drive and wheels. Maintenance and costly delays for repairs are minimized, life of scraper parts lengthened.

Timken bearings, with their tapered construction, carry both radial and thrust loads in any combination. They hold moving parts in proper alignment, keep gears meshing accurately. Due to line contact between rollers and races, they have tremendous load-carrying capacity. True rolling motion and the incredibly smooth surface finish of Timken bearings keep friction to a minimum.

Timken bearings retain lubricants longer and save both maintenance time and material. How? By keeping shaft and housing concentric, closures are made more effective.

Even under the most rugged conditions, Timken bearings normally last the life of the machine because (1) they're made of Timken fine alloy steel, (2) they're precision manufactured, (3) they're engineered for the job.

To get all the advantages that only Timken bearings can give, specify them in the machines you build; look for them in the machines you buy. Make certain every bearing is stamped with the trade-mark "Timken". The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

This symbol on a product means its bearings are the best.

Application of Timken bearings in the final drive and wheels of a typical LaPlant Choate Scraper.

DESIGN LEADERSHIP

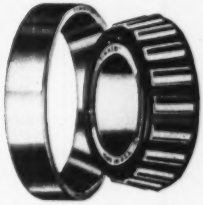
The first Timken tapered roller bearing was produced in 1898. Since then the one-piece multiple perforated cage, wide area contact between roll ends and ribs, and every other important tapered roller bearing improvement have been introduced by The Timken Roller Bearing Company.

The Timken Company leads in: 1. advanced design; 2. precision manufacture; 3. rigid quality control; 4. special analysis steels.

TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

TAPERED ROLLER BEARINGS



NOT JUST A BALL ○ NOT JUST A ROLLER ⊂⊃ THE TIMKEN TAPERED ROLLER ⊂⊃ BEARING TAKES RADIAL ◎ AND THRUST ⊣◎⊢ LOADS OR ANY COMBINATION